AXIOMTEK

CAPA841/842

Intel® Atom™ E3845/E3827
Intel® Celeron® J1900/N2807
Processors Capa Board

User's Manual

RoHS

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CAUTION

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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October 2014, Version A2

Printed in Taiwan

ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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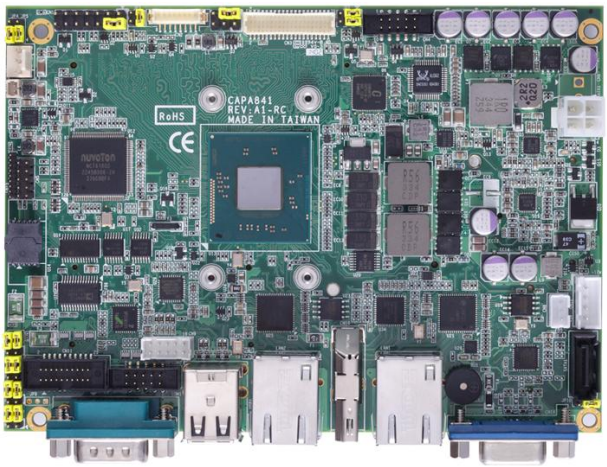
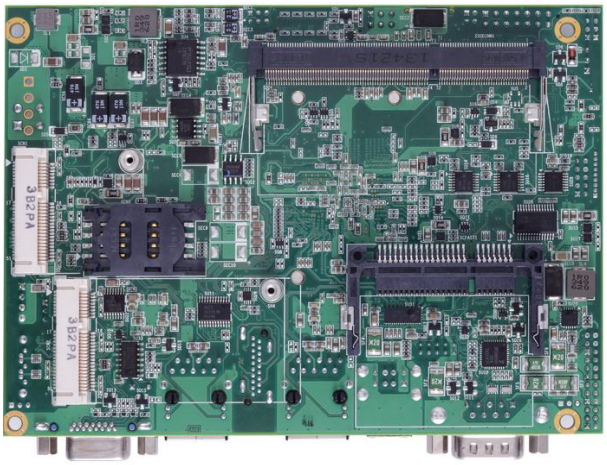
Chapter 1
Introduction





The CAPA841, a 3.5” board, supports Intel® Atom™ E3845/E3827 processors. Meanwhile CAPA842, a 3.5’ board, supports Intel® Celeron® J1900/N2807 processors. Both of them deliver outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

The CAPA841/CAPA842 comes with one 204-pin unbuffered SO-DIMM socket for single channel DDR3L 1333/1066MHz memory, maximum memory capacity up to 8GB. There are two Gigabit/Fast Ethernet ports, one SATA port with transfer rate up to 3Gb/s, four USB 2.0 high speed compliant, and built-in HD audio codec that can achieve the best stability and reliability for industrial applications. Additionally, they provide you with unique embedded features, such as four serial ports (two RS-232/422/485 and two RS-232) and 3.5” form factor that applies an extensive array of PC peripherals.

1.1 Features

- CAPA841- Intel® Atom™ quad core E3845 (1.91GHz) and dual core E3827 (1.75GHz)
- CAPA842 - Intel® Celeron® quad core J1900 (2GHz) and dual core N2807 (1.58GHz)
- 1 DDR3L SO-DIMM supports up to 8 GB memory capacity
- 4 USB 2.0 ports
- 4 COM ports
- 2 PCI-Express Mini Card
- +12V only DC-in supported
- Wide operating temperature supported

1.2 Specifications

- **CPU**
  - CAPA841
    - Intel® Atom™ quad core E3845 1.86GHz.
    - Intel® Atom™ dual core E3827 1.75GHz.
  - CAPA842
    - Intel® Celeron® quad core J1900 2GHz.
    - Intel® Celeron® dual core N2807 1.58GHz.

- **Thermal Solution**
  - Passive.

- **Operating Temperature**
  - CAPA841: -40°C~80°C or -20°C~80°C.
  - CAPA842: -20°C~-70°C.

- **BIOS**
  - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
  - 16Mbit SPI Flash, DMI, Plug and Play.
  - PXE Ethernet Boot ROM.

- **System Memory**
  - One 204-pin unbuffered DDR3L SO-DIMM socket.
  - Maximum up to 8GB DDR3L 1333/1066MHz memory.

- **Onboard Multi I/O**
  - Controller: Nuvoton NCT6106D.
  - Serial Ports: Two ports for RS-232/422/485 and two ports for RS-232.

- **Serial ATA**
  - One SATA-300 connector.
  - One CFast™ socket.
  - mSATA supported (Optional).

- **USB Interface**
  - Four USB ports with fuse protection and complies with USB Spec. Rev. 2.0.

- **Display**
  - One 15-pin D-Sub as VGA connector.
  - One 2x20-pin connector for 18/24-bit single/dual channel LVDS and one 8-pin inverter connector. LVDS resolution is up to 1920x1200 in 24-bit dual channels.
  - One HDMI.

- **Trusted Platform Module (TPM)**
  - Controller: ST ST33TPM12LPC via LPC bus interface.
  - Complies with TPM1.2 main and PC client specification.

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.

- **Ethernet**
  - Two RJ-45 LAN ports: Intel® i210IT supports 1000/100/10Mbps Gigabit/Fast Ethernet with Wake-on-LAN and PXE Boot ROM.

- **Audio**
  - HD audio compliant with Realtek ALC662.
  - Speaker/line-out and line-in/MIC-in via box header connector.

- **Expansion Interface**
  - One full-size PCI-Express Mini Card socket complies with PCI-Express Mini Card Spec. V1.2.
  - One half-size PCI-Express Mini Card socket complies with PCI-Express Mini Card Spec. V1.2.

- **Power Input**
  - One 2x2-pin connector
  - +12V DC-in only
  - AT auto power on function supported

- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).

- **Form Factor**
  - 3.5” form factor.

Note

All specifications and images are subject to change without notice.

1.3 Utilities Supported

- Chipset and graphics driver
- Ethernet driver
- Audio driver
- Trusted Execution Engine
- Sideband Fabric Device

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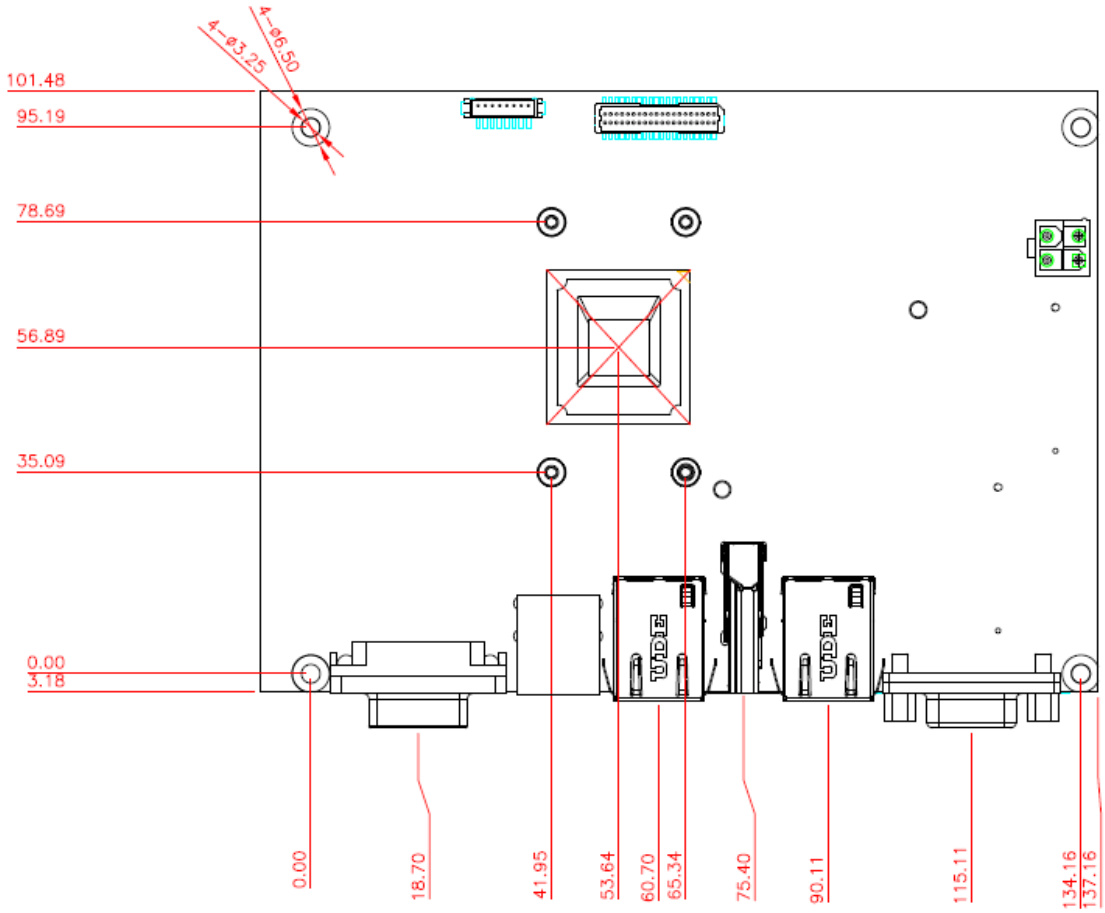
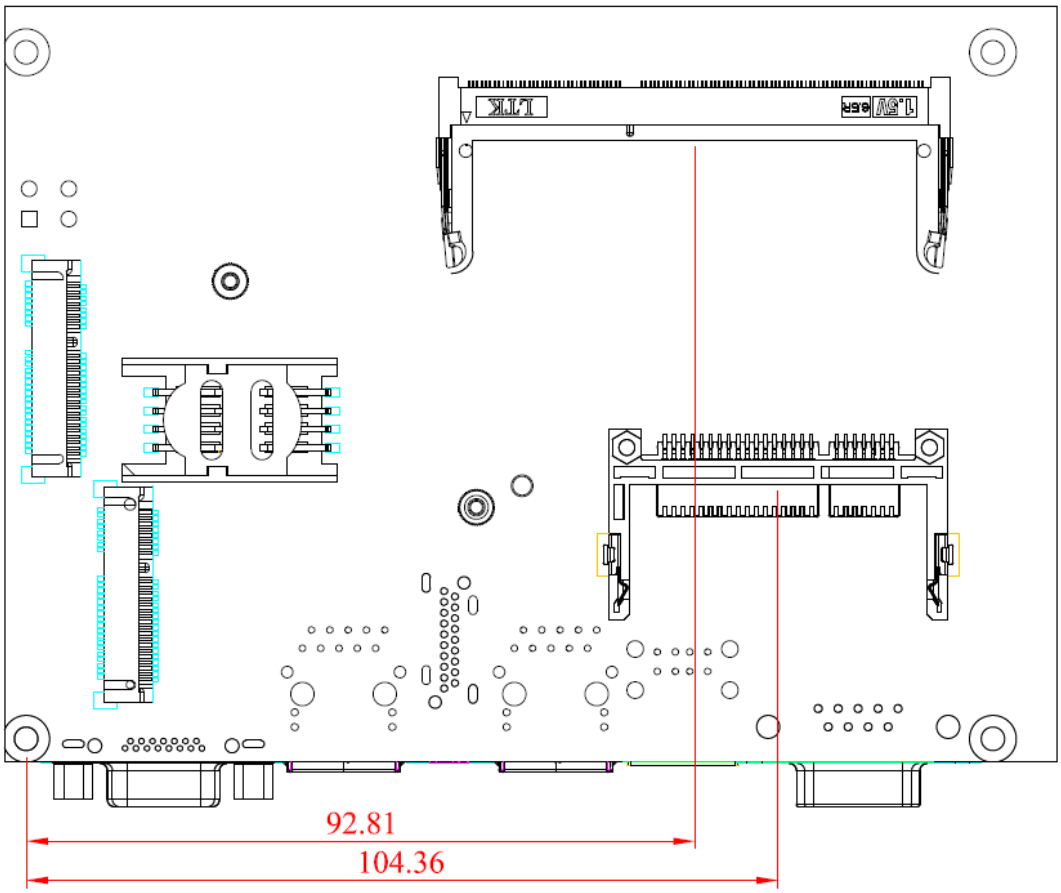
Chapter 2
Board and Pin Assignments

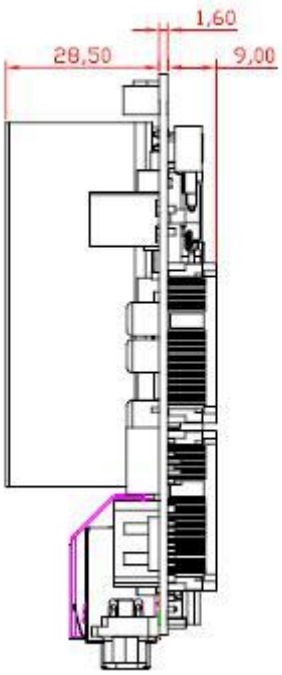
2.1 Board Dimensions and Fixing Holes



Top View

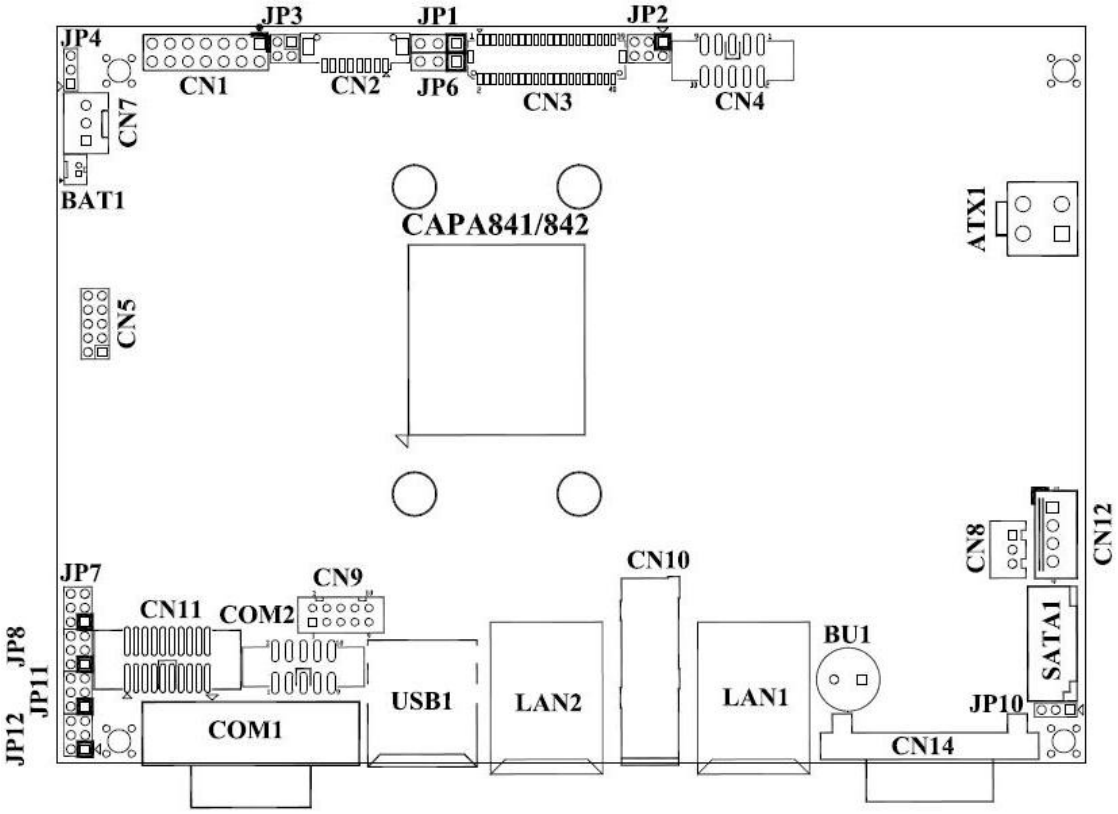


Bottom View

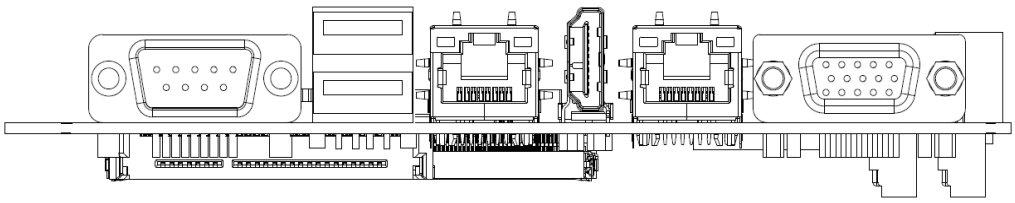


Side View

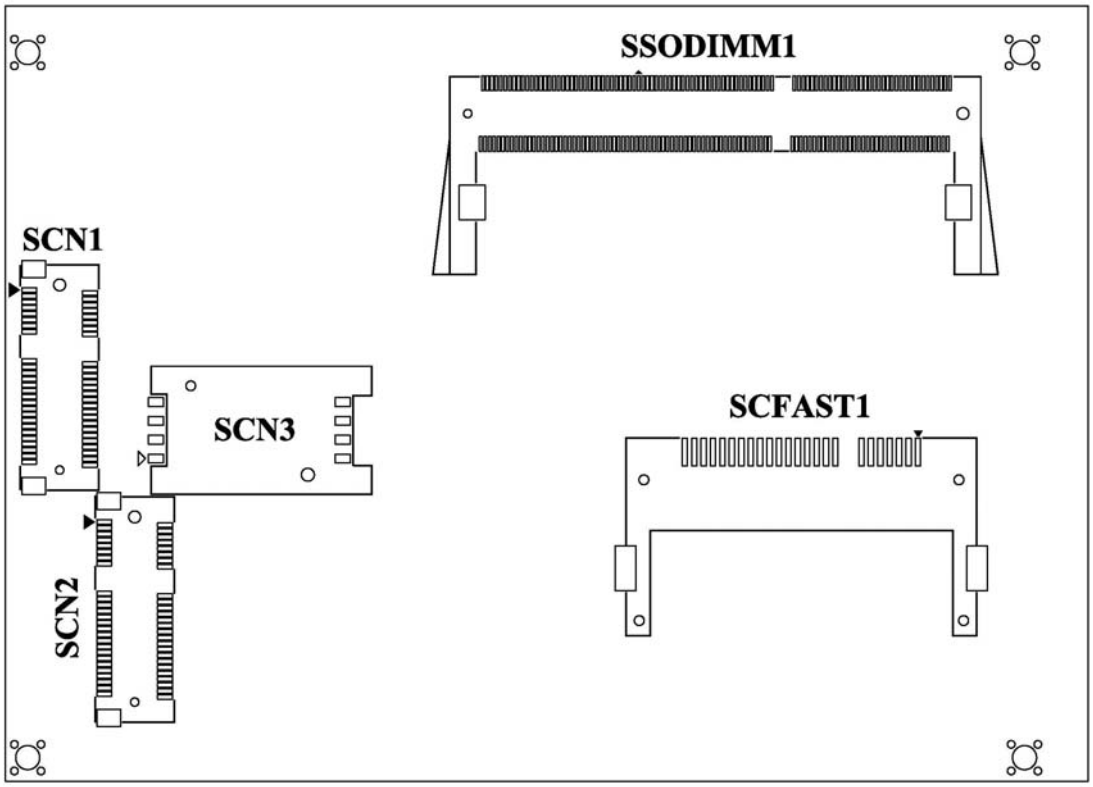
2.2 Board Layout



Top View



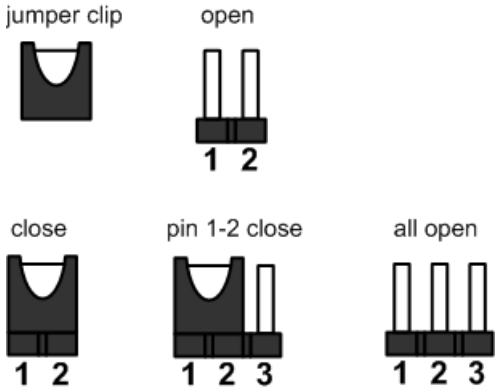
Side View



Bottom View

2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. Below illustration shows how to set up jumper.



Properly configure jumper settings on the CAPA841/842 to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

Note

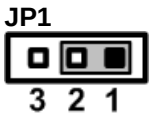
Once the default jumper setting needs to be changed, please do it under power-off condition.

Jumper	Description		Setting
JP1	LVDS +3.3V/+5V Voltage Selection Default: +3.3V		1-2 Close
JP2	Audio Output Selection Default: Line-out		1-3, 2-4 Close
JP3	LVDS Brightness Control Mode Setting Default: PWM Mode		1-2 Close
JP4	Restore BIOS Optimal Defaults Default: Normal Operation		1-2 Close
JP6	LVDS +12V Voltage Selection Default: None		None
JP7	COM4 Data/Power Selection Default: RS-232 Data	CN11 Pin 11: DCD	3-5 Close
		CN11 Pin 18: RI	4-6 Close
JP8	COM3 Data/Power Selection Default: RS-232 Data	CN11 Pin 1: DCD	3-5 Close
		CN11 Pin 8: RI	4-6 Close
JP10	Auto Power On Default: Disable		1-2 Close
JP11	COM2 Data/Power Selection Default: RS-232 Data	COM2 Pin 1: DCD	3-5 Close
		COM2 Pin 8: RI	4-6 Close
JP12	COM1 Data/Power Selection Default: RS-232 Data	COM1 Pin 1: DCD	3-5 Close
		COM1 Pin 9: RI	4-6 Close

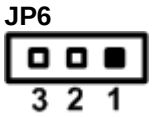
2.3.1 LVDS Voltage Selection (JP1 and JP6)

The board supports voltage selection for flat panel displays. Use these jumpers to set LVDS connector (CN3) pin 1~6 VCCM to +3.3V, +5V or +12V. To prevent hardware damage, before connecting please make sure that input voltage of flat panel is correct.

Function	JP1 Setting
+3.3V level (Default)	1-2 close
+5V level	2-3 close



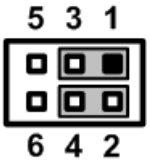
Function	JP6 Setting
+12V level	1-2 close
N/A	2-3 close



2.3.2 Audio Output Selection (JP2)

Use this jumper to select line out or speaker out as source of audio output on audio connector. When speaker out is used, it delivers 1W/channel continuous at 8Ω loads.

Function	Setting
Line out (Default)	1-3, 2-4 close
Speaker out	3-5, 4-6 close



2.3.3 LVDS Brightness Control Mode Setting (JP3)

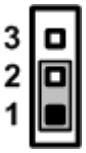
The JP3 enables you to select PWM or voltage control mode for inverter connector (CN2). These two control modes are for adjusting the brightness of LVDS panel.

Function	Setting
PWM mode (Default)	1-2 close
Voltage mode	3-4 close

2.3.4 Restore BIOS Optimal Defaults (JP4)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close



2.3.5 COM4 Data/Power Selection (JP7)

The COM4 port has +5V level power capability on DCD and +12V level on RI by setting this jumper.

Function	Setting
Power: Set CN11 pin 11 to +5V level	1-3 close
Data: Set CN11 pin 11 to DCD (Default)	3-5 close
Power: Set CN11 pin 18 to +12V level	2-4 close
Data: Set CN11 pin 18 to RI (Default)	4-6 close

2.3.6 COM3 Data/Power Selection (JP8)

The COM3 port has +5V level power capability on DCD and +12V level on RI by setting this jumper.

Function	Setting
Power: Set CN11 pin 1 to +5V level	1-3 close
Data: Set CN11 pin 1 to DCD (Default)	3-5 close
Power: Set CN11 pin 8 to +12V level	2-4 close
Data: Set CN11 pin 8 to RI (Default)	4-6 close

2.3.7 Auto Power On (JP10)

If JP10 is enabled for AC power input, the system will be automatically power on without pressing soft power button. If JP10 is disabled for AC power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Disable auto power on (Default)	1-2 close
Enable auto power on	2-3 close

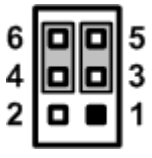
Note

This function is similar to the feature of power on after power failure, which is controlled by hardware circuitry instead of BIOS.

2.3.8 COM2 Data/Power Selection (JP11)

The COM2 port has +5V level power capability on DCD and +12V level on RI by setting this jumper. When this port is set to +5V or +12V level, please make sure its communication mode is RS-232. You can change the communication mode (RS-232/422/485) via BIOS setting, see section 4.4.

Function	Setting
Power: Set COM2 pin 1 to +5V level	1-3 close
Data: Set COM2 pin 1 to DCD (Default)	3-5 close
Power: Set COM2 pin 8 to +12V level	2-4 close
Data: Set COM2 pin 8 to RI (Default)	4-6 close



2.3.9 COM1 Data/Power Selection (JP12)

The COM1 port has +5V level power capability on DCD and +12V level on RI by setting this jumper. When this port is set to +5V or +12V level, please make sure its communication mode is RS-232. You can change the communication mode (RS-232/422/485) via BIOS setting, see section 4.4.

Function	Setting
Power: Set COM1 pin 1 to +5V level	1-3 close
Data: Set COM1 pin 1 to DCD (Default)	3-5 close
Power: Set COM1 pin 9 to +12V level	2-4 close
Data: Set COM1 pin 9 to RI (Default)	4-6 close

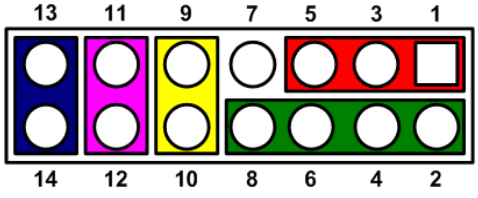
2.4 Connectors

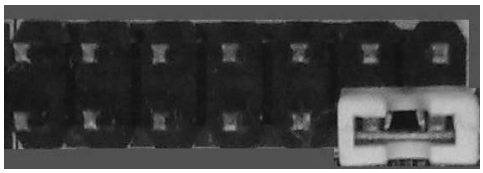
Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table of connectors on the hardware.

Connector	Description
CN1	Front Panel Connector
CN2	Inverter Connector
CN3	LVDS Connector
CN4	Audio Connector
CN5	Digital I/O Port Connector
CN7	Fan Connector
CN8	SMBus Connector
CN9	USB Wafer Port 2 and 3
CN10	HDMI Connector
CN11	COM3 and COM4 Connector
CN12	SATA Power Connector
CN14	VGA Connector
ATX1	Power Connector
SATA1	SATA Connector
USB1	USB Port 0 and 1
SCFAST1	CFast™ Socket
LAN1~2	Ethernet Port 1~Port 2
COM1	COM1 Connector
COM2	COM2 Connector
BAT1	CMOS Battery Connector
SCN1	Half-size PCI-Express Mini Card Connector
SCN2	Full-size PCI-Express Mini Card Connector
SCN3	SIM Card Slot
SSODIMM1	DDR3L SO-DIMM Connector

2.4.1 Front Panel Connector (CN1)

Pin	Signal
1	PWRLED+
2	EXT SPK-
3	N.C.
4	Buzzer
5	PWRLED-
6	N.C.
7	N.C.
8	EXT SPK+
9	PWRSW-
10	PWRSW+
11	HW RST-
12	HW RST+
13	HDDLED-
14	HDDLED+





Power LED
Pin 1 connects anode(+) of LED and pin 5 connects cathode(-) of LED. The power LED lights up when the system is powered on.

External Speaker and Internal Buzzer
Pin 2, 4, 6 and 8 connect the case-mounted speaker unit or internal buzzer. While connecting the CPU board to an internal buzzer, please set pin 2 and 4 closed; while connecting to an external speaker, you need to set pins 2 and 4 opened and connect the speaker cable to pin 8(+) and pin 2(-).

Power On/Off Button
Pin 9 and 10 connect the power button on front panel to the CPU board, which allows users to turn on or off power supply.

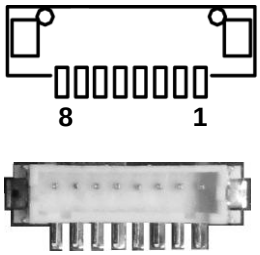
System Reset Switch
Pin 11 and 12 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

HDD Activity LED
This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, pin 13 is assigned as cathode(-) and pin 14 is assigned as anode(+).

2.4.2 Inverter Connector (CN2)

This is a DF13-8S-1.25C 8-pin connector for inverter. We strongly recommend you to use the matching DF13-8S-1.25C connector to avoid malfunction.

Pin	Signal
1	VBL1 (+12V level)
2	VBL1 (+12V level)
3	VBL2 (+5V level)
4	VBL_ENABLE
5	GND
6	GND
7	GND
8	VBL Brightness Control

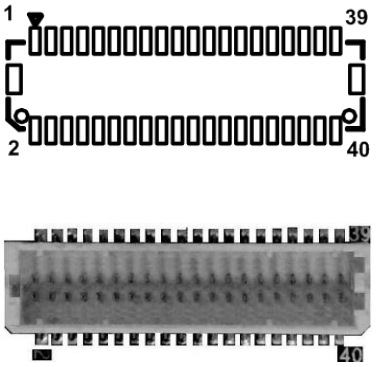


2.4.3 LVDS Connector (CN3)

This board has a 2x20-pin connector for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V, +5V or +12V by setting JP1 or JP6 (see section 2.3.1).

18-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND



24-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

18-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	Channel B D0-
13	N.C.	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

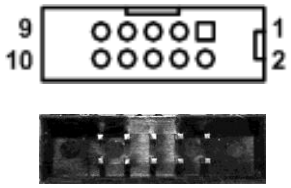
24-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

2.4.4 Audio Connector (CN4)

Pin 7 and pin 9 of connector CN4 can be set to different audio source by setting JP2 (see section 2.3.2).

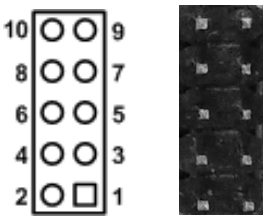
Pin	Signal	Pin	Signal
1	MIC_IN	2	GND
3	LINE_IN_L	4	GND
5	LINE_IN_R	6	GND
7	AUDIO_OUT_L	8	GND
9	AUDIO_OUT_R	10	GND



2.4.5 Digital I/O Port Connector (CN5)

The board is equipped with an 8-channel (3 inputs and 5 outputs) digital I/O connector that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals.

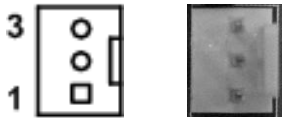
Pin	Signal	Pin	Signal
1	Digital Input 0	2	Digital Output 0
3	Digital Input 1	4	Digital Output 1
5	Digital Input 2	6	Digital Output 2
7	GND	8	Digital Output 3
9	GND	10	Digital Output 4



2.4.6 Fan Connector (CN7)

A fan interface is available through this connector. You can find fan speed within BIOS Setup Utility if fan is installed. For further information, see BIOS Setup Utility: Advanced\H/W Monitor\PC Health Status (see section 4.4).

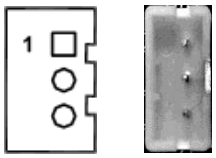
Pin	Signal
1	GND
2	+12V level
3	Fan speed feedback



2.4.7 SMBus Connector (CN8)

This connector is for SMBus interface. The SMBus (System Management Bus) is a simple 2-wire bus for the purpose of lightweight communication.

Pin	Signal
1	CLK
2	DATA
3	GND

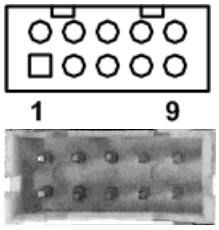


2.4.8 USB Wafer Connector (CN9)

This 2x5 pin wafer is a Universal Serial Bus (USB) connector for installing versatile USB 2.0 compliant interface peripherals.

The CN9 carries USB port 2 and 3.

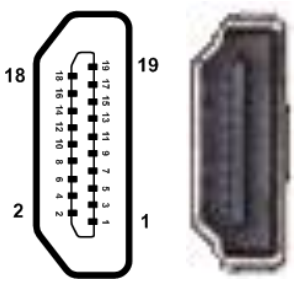
Pin	Signal	Pin	Signal
1	USB VCC (+5V level)	2	USB VCC (+5V level)
3	USB #2_D-	4	USB #3_D-
5	USB #2_D+	6	USB #3_D+
7	GND	8	GND
9	GND	10	GND



2.4.9 HDMI Connector (CN10)

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable. Its interface is available through connector CN10.

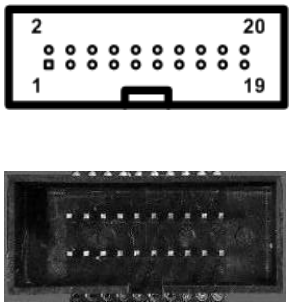
Pin	Signal	Pin	Signal
1	HDMI OUT_DATA2+	2	GND
3	HDMI OUT_DATA2-	4	HDMI OUT_DATA1+
5	GND	6	HDMI OUT_DATA1-
7	HDMI OUT_DATA0+	8	GND
9	HDMI OUT_DATA0-	10	HDMI OUT_Clock+
11	GND	12	HDMI OUT_Clock-
13	CEC	14	N.C.
15	HDMI OUT_SCL	16	HDMI OUT_SDA
17	GND	18	+5V
19	HDMI_HTPLG		



2.4.10 COM3 and COM4 Connector (CN11)

Both COM3 and COM4 ports have +5V level power capability on DCD and 12V level on RI by setting JP8 and JP7, respectively (see section 2.3.6 and 2.3.5). The pin assignments are listed in table below.

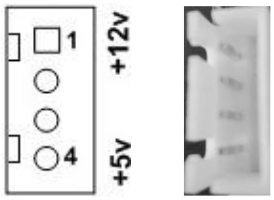
Pin	Signal	Pin	Signal
1	DCD3	2	DSR3
3	RXD3	4	RTS3
5	TXD3	6	CTS3
7	DTR3	8	RI3
9	GND	10	N.C.
11	DCD4	12	DSR4
13	RXD4	14	RTS4
15	TXD4	16	CTS4
17	DTR4	18	RI4
19	GND	20	N.C.



2.4.11 SATA Power Connector (CN12)

Use CN12 for interfacing to SATA 2.5" HDD power supply.

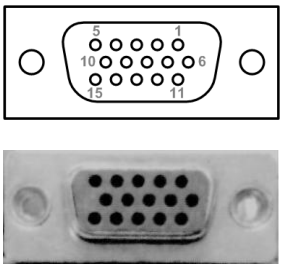
Pin	Signal
1	+12V level
2	GND
3	GND
4	+5V level



2.4.12 VGA Connector (CN14)

This is a 15-pin D-Sub connector which is commonly used for VGA display. This VGA interface configuration can be configured via software utility.

Pin	Signal	Pin	Signal
1	Red	2	Green
3	Blue	4	N.C.
5	GND	6	DETECT
7	GND	8	GND
9	VCC	10	GND
11	N.C.	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync
15	DDC CLK		

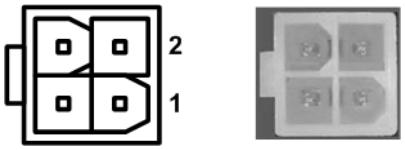


2.4.13 Power Connector (ATX1)

Steady and sufficient power can be supplied to all components on the board by connecting the power connector. Please make sure all components and devices are properly installed before connecting the power connector.

The ATX1 is a 4-pin power supply interface. External power supply plug fits into ATX1 in only one orientation. Properly press down power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

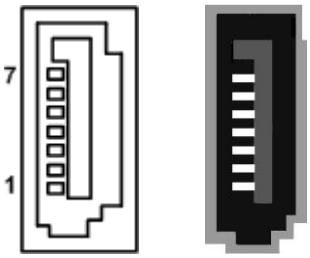
Pin	Signal
1	GND
2	GND
3	+12V
4	+12V



2.4.14 SATA Connector (SATA1)

This Serial Advanced Technology Attachment (Serial ATA or SATA) connector is for high-speed SATA interface. It is a computer bus interface for connecting to devices such as hard disk drive.

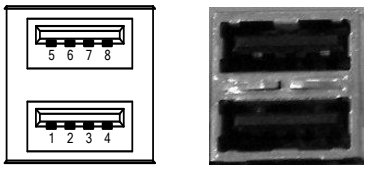
Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



2.4.15 USB Port (USB1)

The USB1 is a Universal Serial Bus (compliant with USB 2.0 (480Mbps)) connector on the rear I/O. It is commonly used for installing USB peripherals such as keyboard, mouse, scanner, etc.

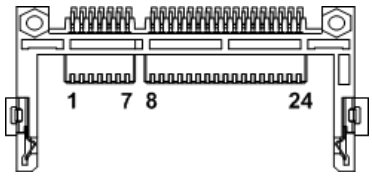
Pin	Signal	Pin	Signal
1	USB VCC (+5V level)	5	USB VCC (+5V level)
2	USB #0_D-	6	USB #1_D-
3	USB #0_D+	7	USB #1_D+
4	GND	8	GND

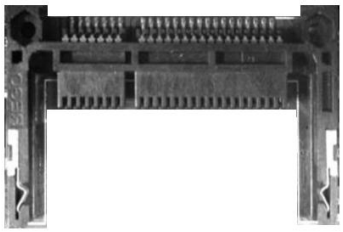


2.4.16 CFast™ Socket (SCFAST1)

The board is equipped with a CFast™ socket on the bottom side to support a CFast™ card which is based on the SATA bus. The socket is specially designed to avoid incorrect installation of the CFast™ card. When installing or removing the CFast™ card, please make sure the system power is off. The CFast™ card by default identifies itself as C: or D: drive in your PC system.

Pin	Signal	Pin	Signal
1	GND	13	N.C
2	SATA_TX+	14	GND
3	SATA_TX-	15	N.C
4	GND	16	CFAST_LED#
5	SATA_RX-	17	N.C
6	SATA_RX+	18	N.C
7	GND	19	N.C
8	N.C	20	+3.3V Level
9	GND	21	+3.3V Level
10	N.C	22	GND
11	N.C	23	GND
12	N.C	24	N.C

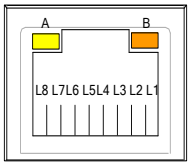


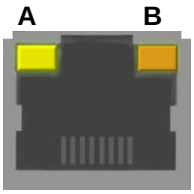


2.4.17 Ethernet Ports (LAN1 and LAN2)

The board has two RJ-45 connectors: LAN1 and LAN2. Ethernet connection can be established by plugging one end of the ethernet cable into this RJ-45 connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

Pin	Signal	Pin	Signal
L1	MDI0+	L5	MDI2+
L2	MDI0-	L6	MDI2-
L3	MDI1+	L7	MDI3+
L4	MDI1-	L8	MDI3-
A	Active LED (Yellow)		
B	100 LAN LED (Green) / 1000 LAN LED (Orange)		

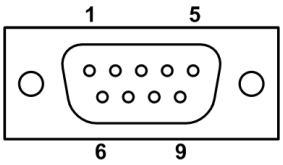




2.4.18 COM1 Connector (COM1)

This is a standard DB-9 connector. It is equipped with +5V level power capability on DCD and +12V level on RI by setting JP12 (see section 2.3.9). The pin assignments of RS-232/RS-422/RS-485 are listed in table below. If you need COM1 port to support RS-422 or RS-485, please refer to BIOS setting in section 4.4.

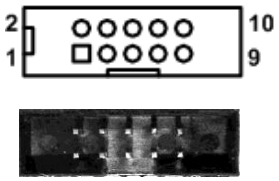
Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	No use
4	DTR	RX-	No use
5	GND	No use	No use
6	DSR	No use	No use
7	RTS	No use	No use
8	CTS	No use	No use
9	RI	No use	No use



2.4.19 COM2 Connector (COM2)

This connector is equipped with +5V level power capability on DCD and +12V level on RI by setting JP11 (see section 2.3.8). The pin assignments of RS-232/RS-422/RS-485 are listed in table below. If you need COM2 port to support RS-422 or RS-485, please refer to BIOS setting in section 4.4.

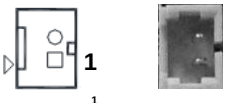
Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	DSR	No use	No use
3	RXD	TX+	Data+
4	RTS	No use	No use
5	TXD	RX+	No use
6	CTS	No use	No use
7	DTR	RX-	No use
8	RI	No use	No use
9	GND	No use	No use
10	No use	No use	No use



2.4.20 CMOS Battery Connector (BAT1)

This connector is for CMOS battery interface.

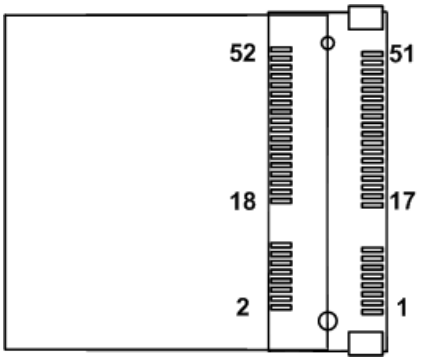
Pin	Signal
1	+3.3V
2	GND



2.4.21 Half-size PCI-Express Mini Card Connector (SCN1)

The SCN1 is a half-size PCI-Express Mini Card connector. It supports the PCI-Express Mini Cards which are applied to either PCI-Express x1 or USB. It complies with PCI-Express Mini Card Spec. V1.2.

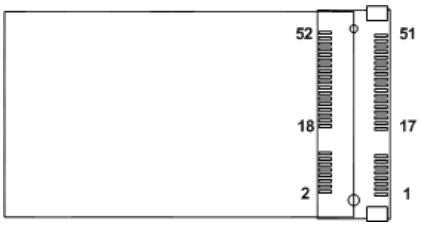
Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	No use
9	GND	10	No use
11	REFCLK-	12	No use
13	REFCLK+	14	No use
15	GND	16	No use
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3	24	+3.3VSB
25	PE_RXP3	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3	32	SMB_DATA
33	PE_TXP3	34	GND
35	GND	36	USB_D8-
37	GND	38	USB_D8+
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB



2.4.22 Full-size PCI-Express Mini Card Connector (SCN2)

This is a PCI-Express Mini Card connector on the bottom side applying to either PCI-Express or USB 2.0 or SATA (mSATA). It complies with PCI-Express Mini Card Spec. V1.2. It can also support mSATA cards. Please refer to BIOS setting in section 4.4 to enable or disable mSATA support

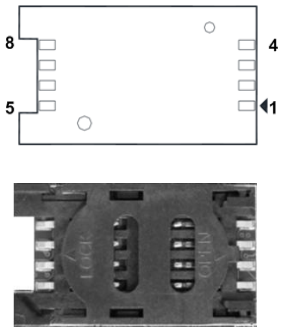
Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	No use
9	GND	10	No use
11	REFCLK-	12	No use
13	REFCLK+	14	No use
15	GND	16	No use
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3/ SATA_RXP	24	+3.3VSB
25	PE_RXP3/ SATA_RXN	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3/ SATA_TXN	32	SMB_DATA
33	PE_TXP3/ SATA_TXP	34	GND
35	GND	36	USB_D8-
37	GND	38	USB_D8+
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB



2.4.23 SIM Card Socket (SCN3)

This board has SCN3 socket on the bottom side for inserting SIM Card. In order to work properly, the SIM Card must be used together with 3G module which is inserted to SCN1 or SCN2. It is mainly used in 3G wireless network application.

Pin	Signal
1	PWR
2	RST
3	CLK
4	NC
5	GND
6	VPP
7	I/O
8	NC



Chapter 3
Hardware Description

3.1 Microprocessors

The CAPA841 supports Intel® Atom™ E3845/E3827 processors and CAPA842 supports Intel® Celeron® J1900/N2807 processors, which enable your system to operate under Windows® 7 and Windows® 8 environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

3.2 BIOS

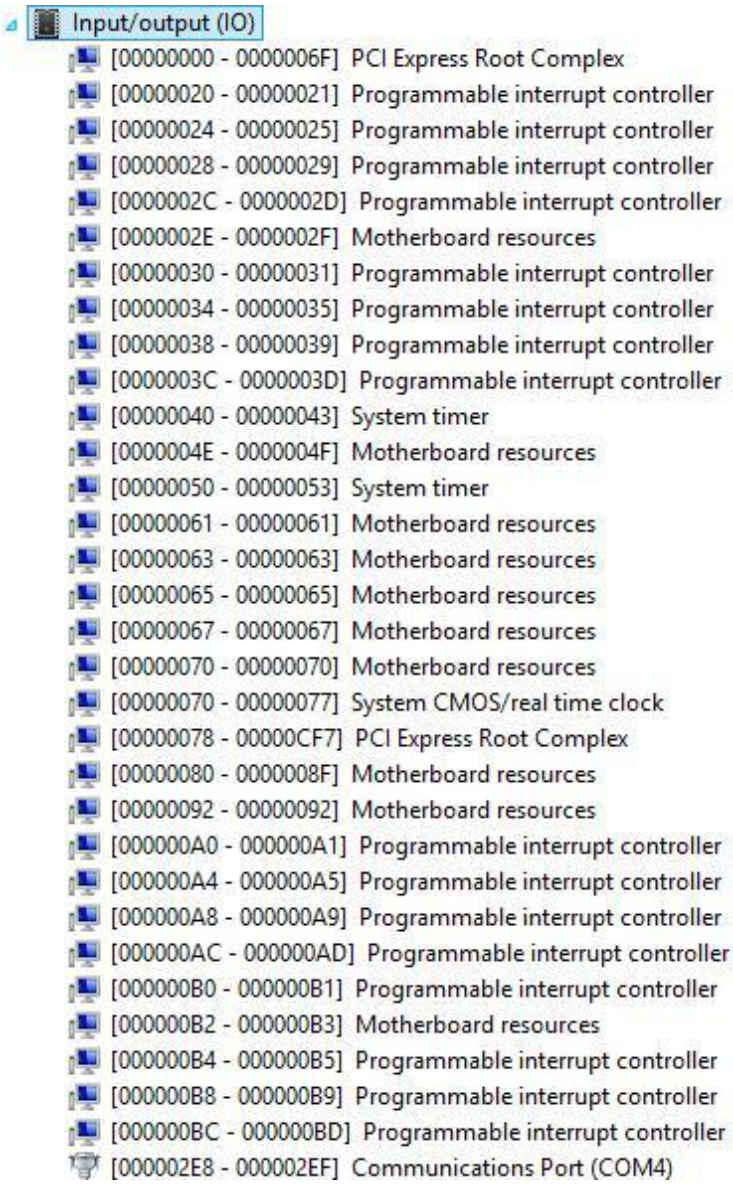
The CAPA841/842 uses AMI Plug and Play BIOS with a single 16Mbit SPI Flash.

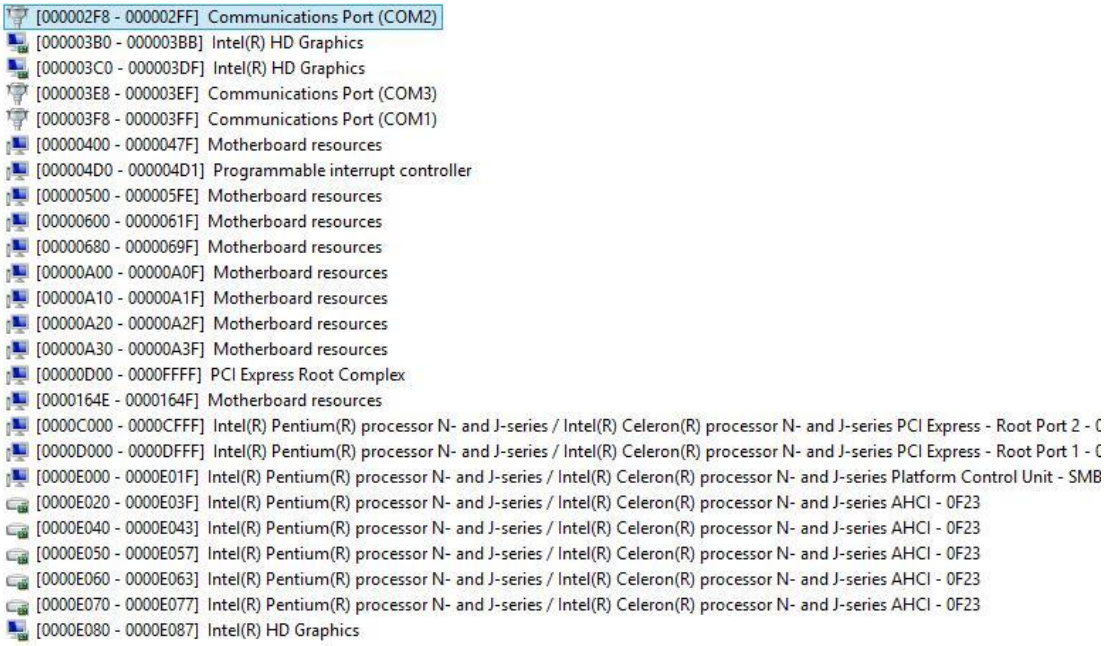
3.3 System Memory

The CAPA841/842 supports one 204-pin DDR3L SO-DIMM socket for a maximum memory of 8GB DDR3L SDRAMs. The memory module comes in sizes of 1GB, 2GB, 4GB and 8GB.

3.4 I/O Port Address Map

Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.




[000002F8 - 000002FF] Communications Port (COM2)
[000003B0 - 000003BB] Intel(R) HD Graphics
[000003C0 - 000003DF] Intel(R) HD Graphics
[000003E8 - 000003EF] Communications Port (COM3)
[000003F8 - 000003FF] Communications Port (COM1)
[00000400 - 0000047F] Motherboard resources
[000004D0 - 000004D1] Programmable interrupt controller
[00000500 - 000005FE] Motherboard resources
[00000600 - 0000061F] Motherboard resources
[00000680 - 0000069F] Motherboard resources
[00000A00 - 00000A0F] Motherboard resources
[00000A10 - 00000A1F] Motherboard resources
[00000A20 - 00000A2F] Motherboard resources
[00000A30 - 00000A3F] Motherboard resources
[00000D00 - 0000FFFF] PCI Express Root Complex
[0000164E - 0000164F] Motherboard resources
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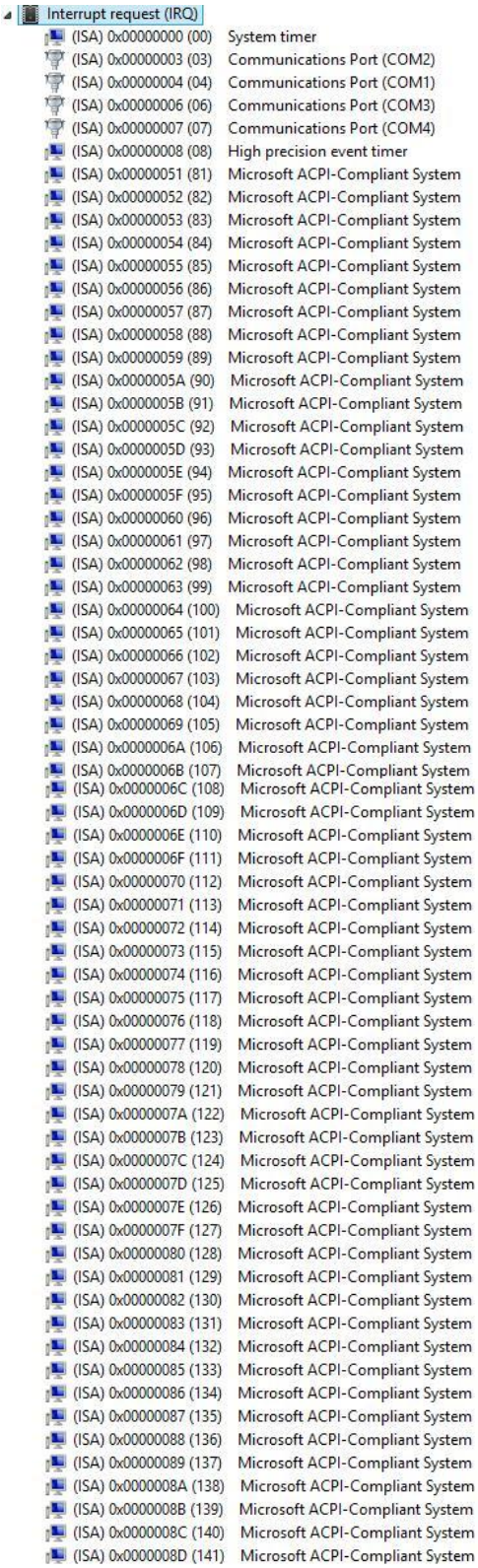
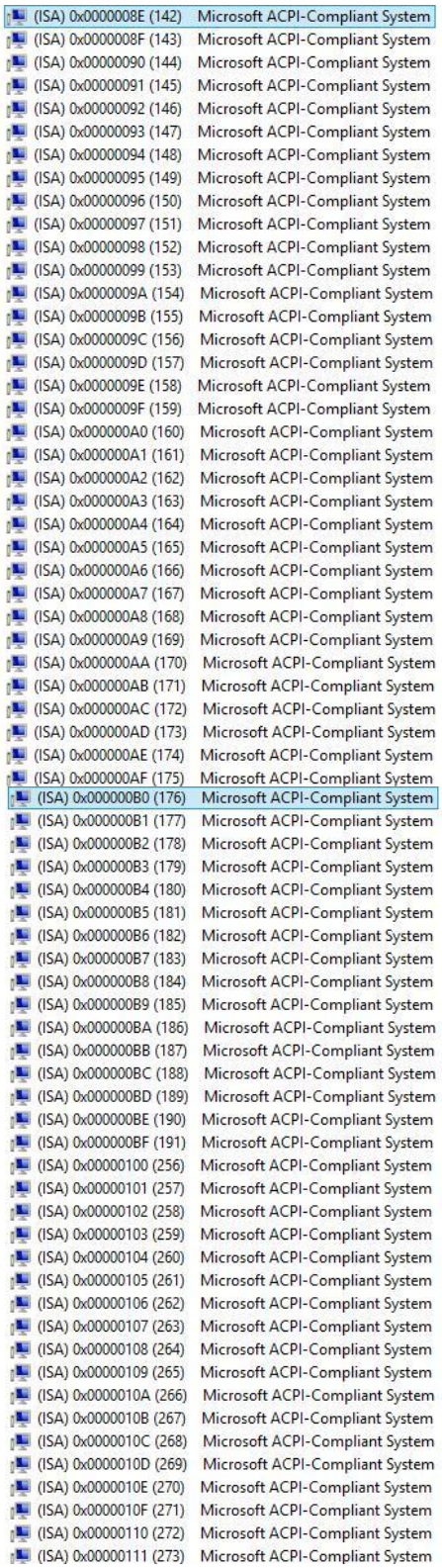
[0000E020 - 0000E03F] Intel(R) Pentium(R) processor N- and J-series / Intel(R) Celeron(R) processor N- and J-series AHCI - 0F23
[0000E040 - 0000E043] Intel(R) Pentium(R) processor N- and J-series / Intel(R) Celeron(R) processor N- and J-series AHCI - 0F23
[0000E050 - 0000E057] Intel(R) Pentium(R) processor N- and J-series / Intel(R) Celeron(R) processor N- and J-series AHCI - 0F23
[0000E060 - 0000E063] Intel(R) Pentium(R) processor N- and J-series / Intel(R) Celeron(R) processor N- and J-series AHCI - 0F23
[0000E070 - 0000E077] Intel(R) Pentium(R) processor N- and J-series / Intel(R) Celeron(R) processor N- and J-series AHCI - 0F23
[0000E080 - 0000E087] Intel(R) HD Graphics

3.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

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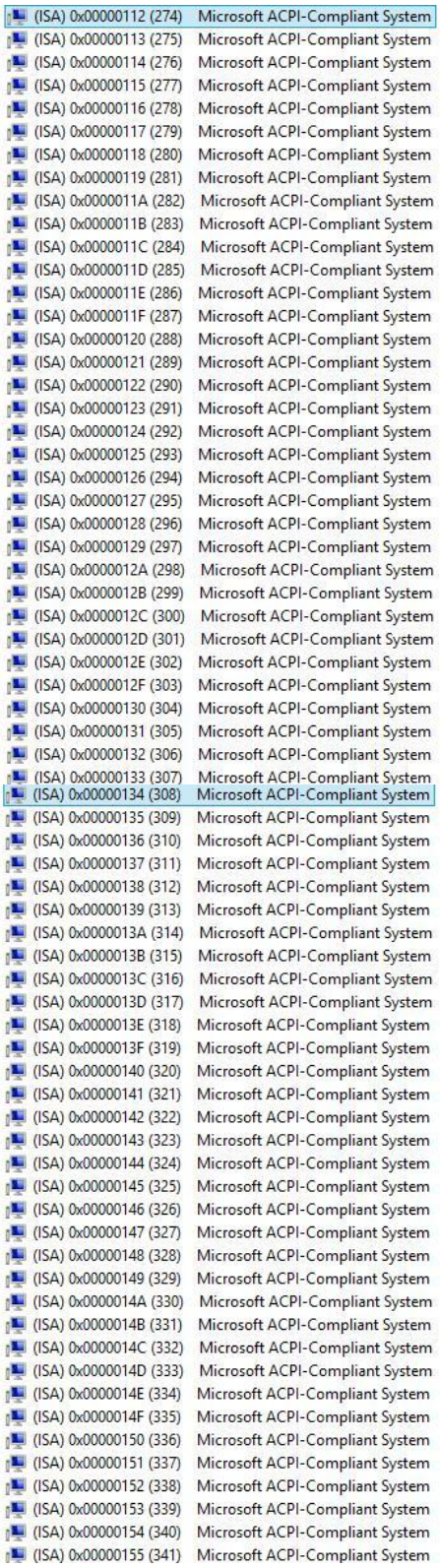
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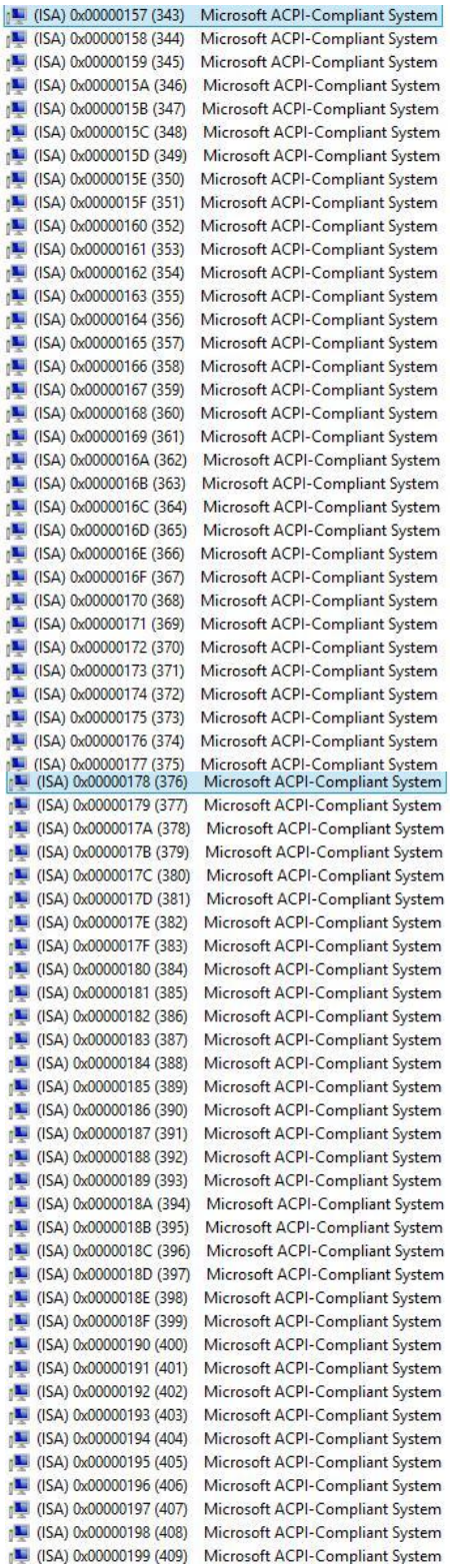
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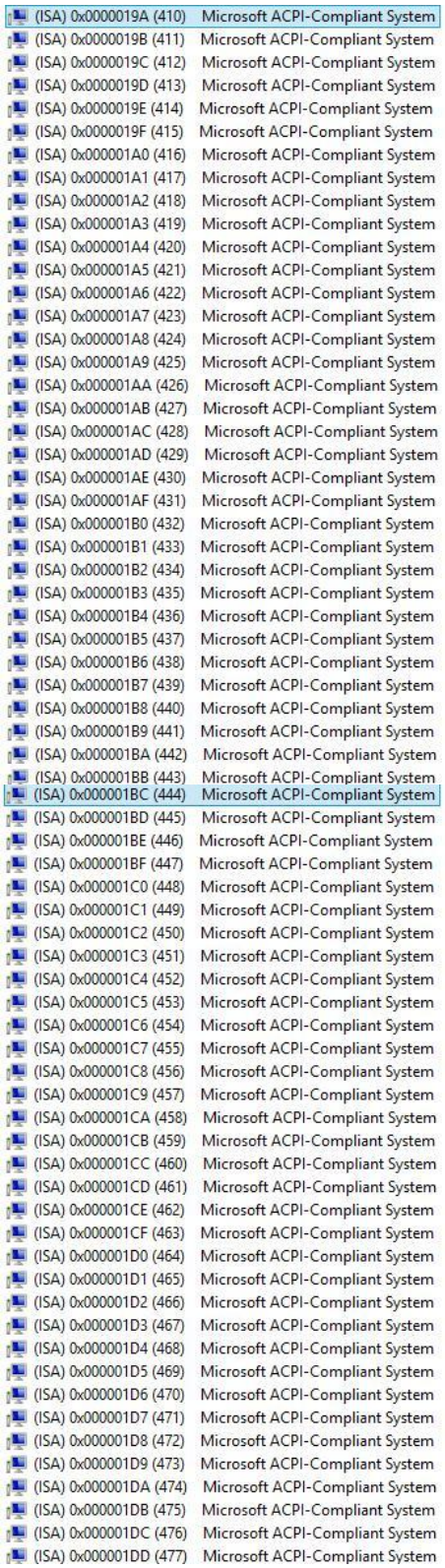
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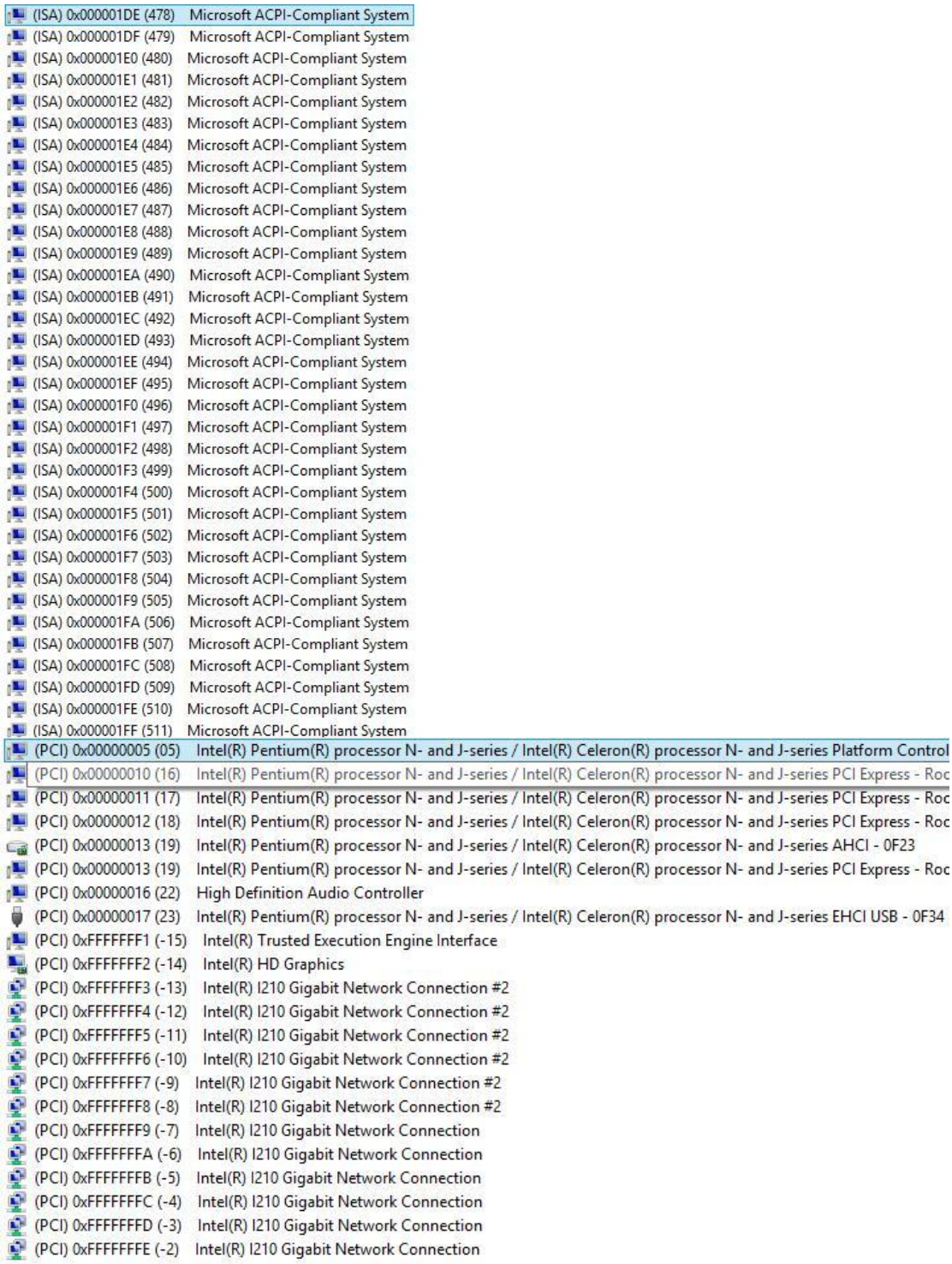
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(PCI) 0x00000016 (22) High Definition Audio Controller
(PCI) 0x00000017 (23) Intel(R) Pentium(R) processor N- and J-series / Intel(R) Celeron(R) processor N- and J-series EHCI USB - 0F34
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(PCI) 0xFFFFFFF2 (-14) Intel(R) HD Graphics
(PCI) 0xFFFFFFF3 (-13) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF4 (-12) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF5 (-11) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF6 (-10) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF7 (-9) Intel(R) I210 Gigabit Network Connection #2
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3.6 Memory Map

The memory mapping list is shown as follows:

Chapter 4
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

Note

If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting JP4 (see section 2.3.4).

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

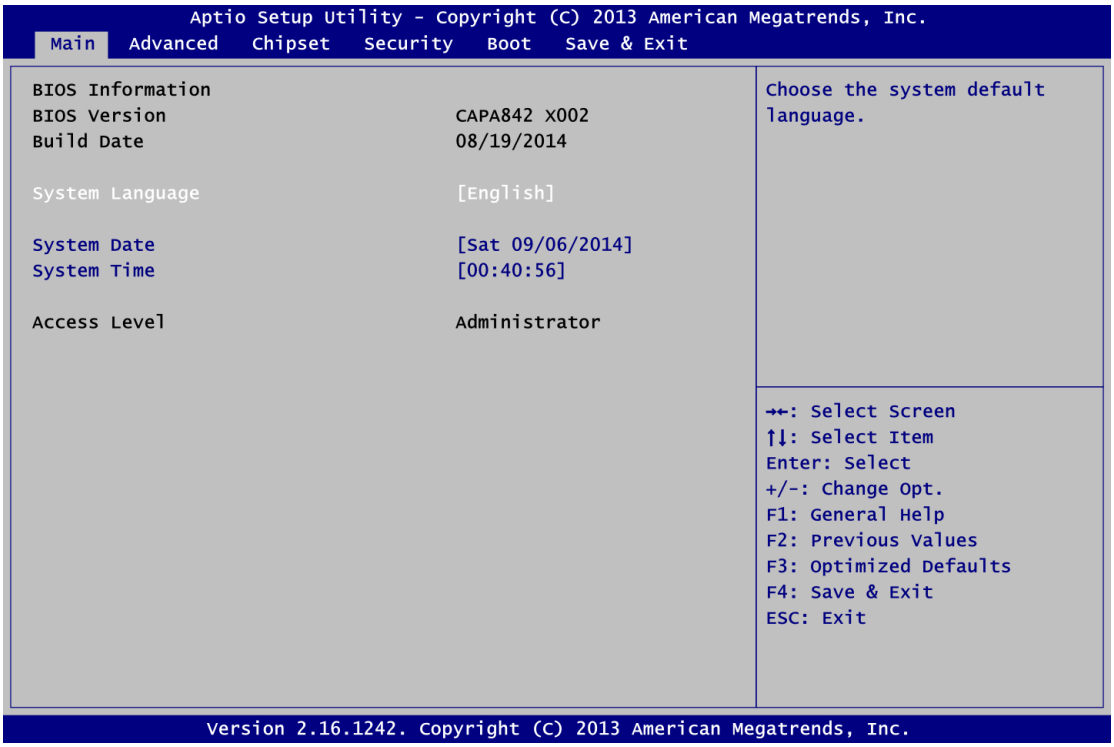
Note

Some of the navigation keys differ from one screen to another.

Hot Keys	Description
→← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

4.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



- **BIOS/Memory Information**
  Display the auto-detected BIOS/memory information.

- **System Language**
  Choose the system default language.

- **System Date/Time**
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

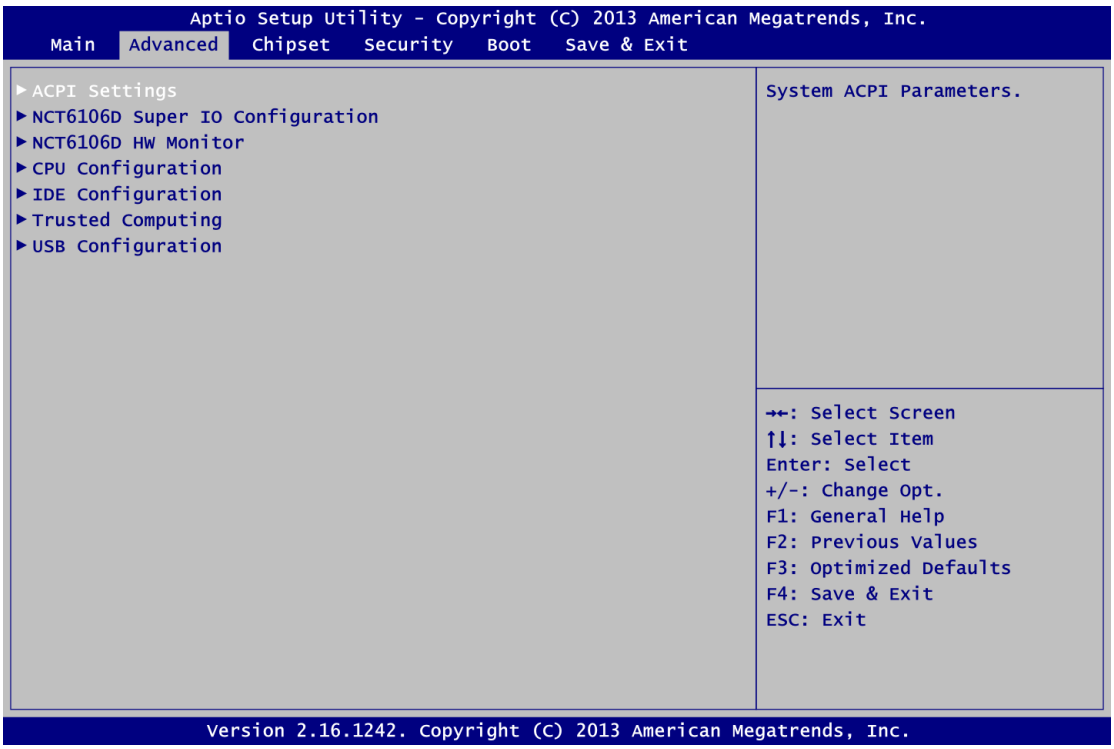
- **Access Level**
  Display the access level of current user.

4.4 Advanced Menu

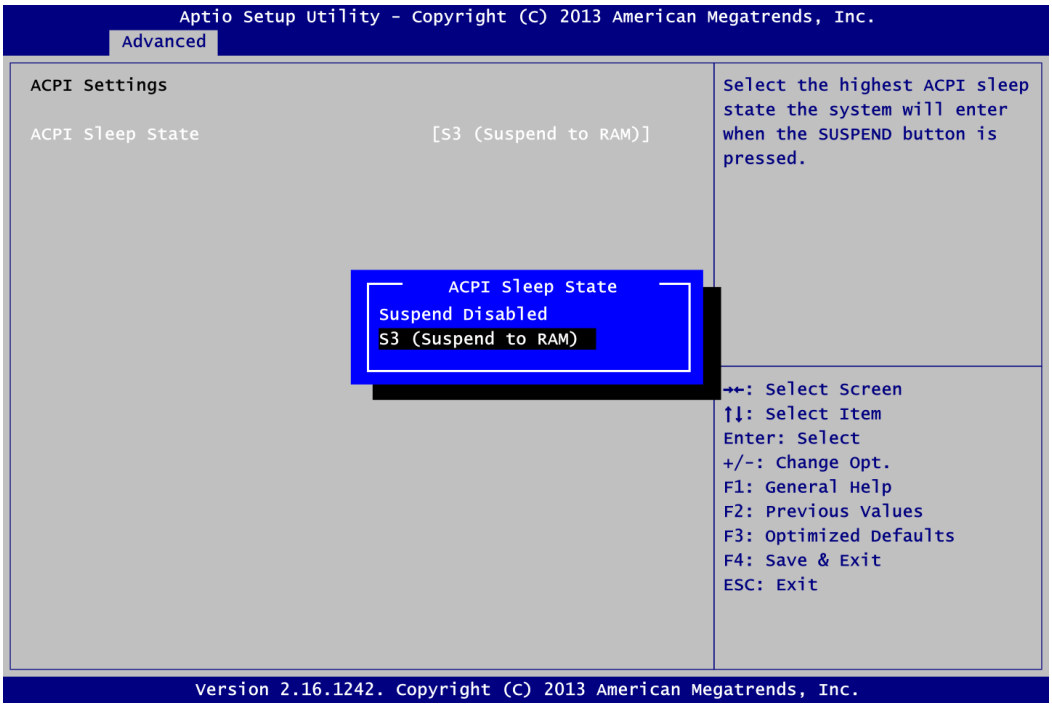
The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ▶ ACPI Settings
- ▶ NCT6106D Super IO Configuration
- ▶ NCT6106D HW Monitor
- ▶ CPU Configuration
- ▶ IDE Configuration
- ▶ Trusted Computing
- ▶ USB Configuration

For items marked with "▶", please press <Enter> for more options.

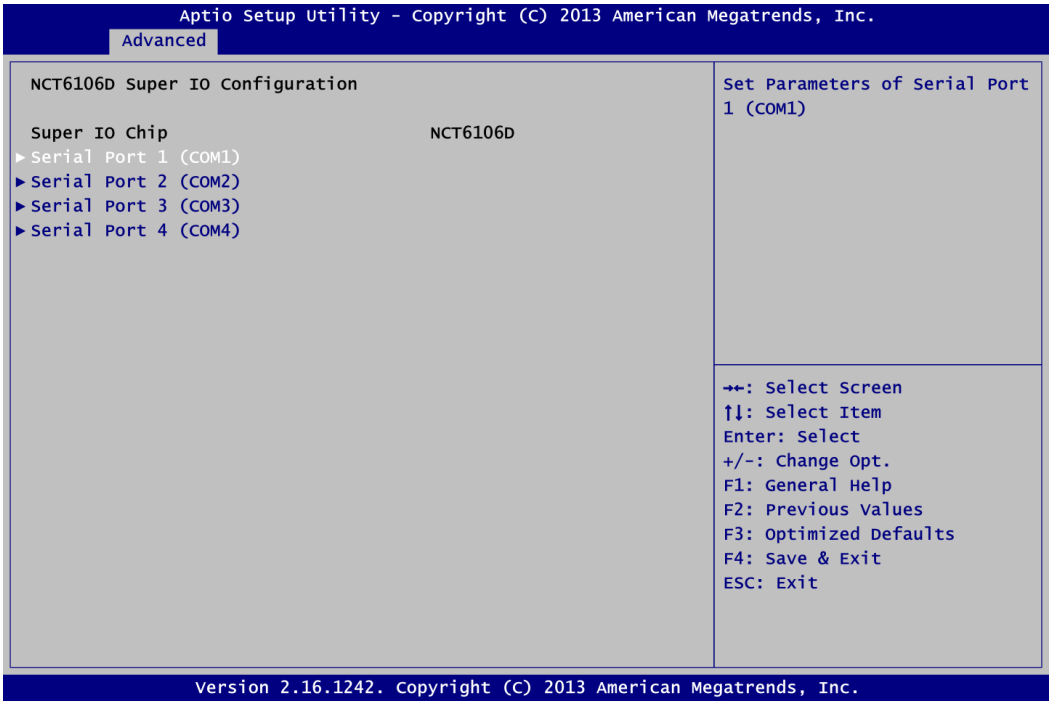


- **ACPI Settings**



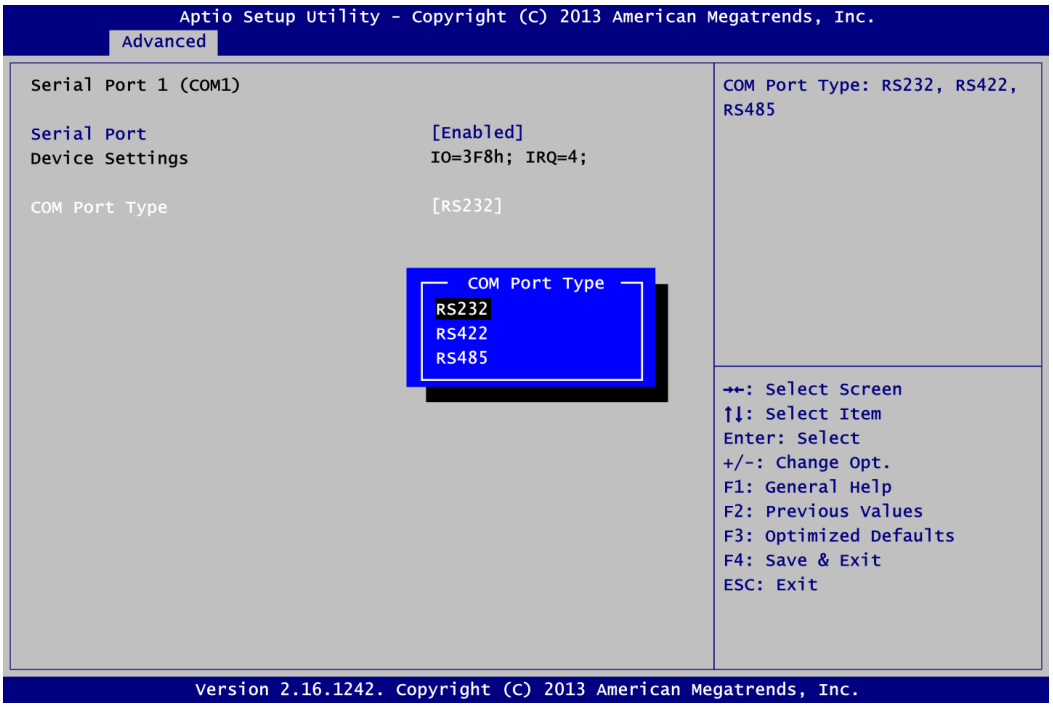
ACPI Sleep State
When the sleep button is pressed, the system will be in the ACPI sleep state. The default is S3 (Suspend to RAM).

- **NCT6106D Super IO Configuration**
  You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.



Serial Port 1~4 (COM1~4) Configuration
Use these items to set parameters related to serial port 1~4.

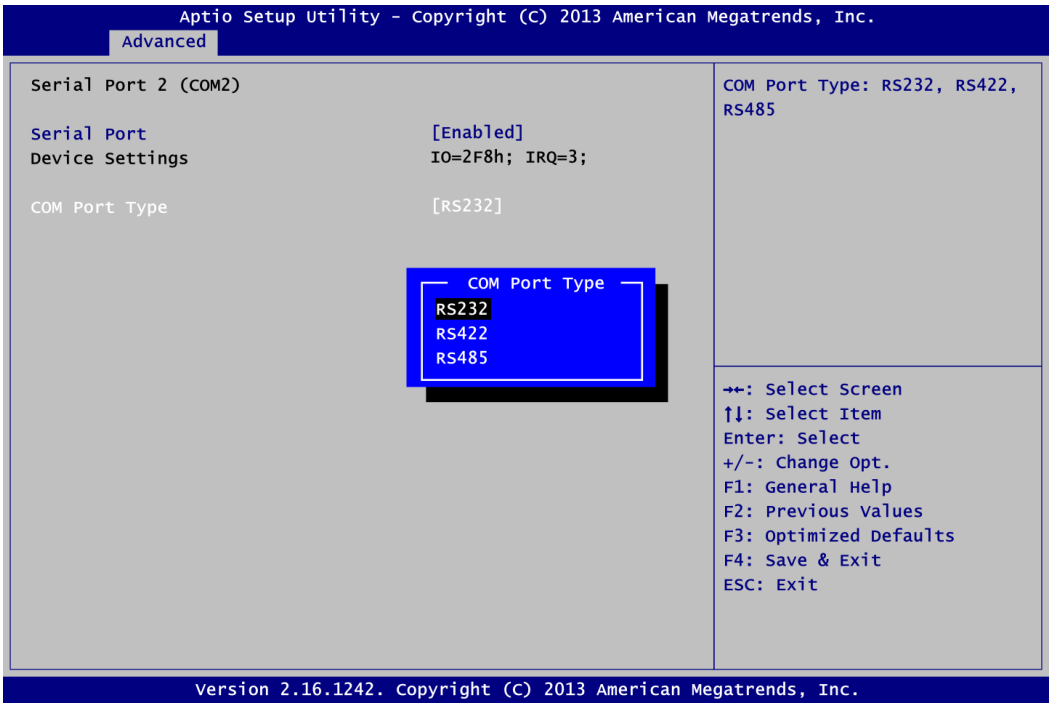
- **Serial Port 1 (COM1) Configuration**



Serial Port
Enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request address is IRQ4.

COM Port Type
Use this option to set RS-232/RS-422/RS-485 mode.

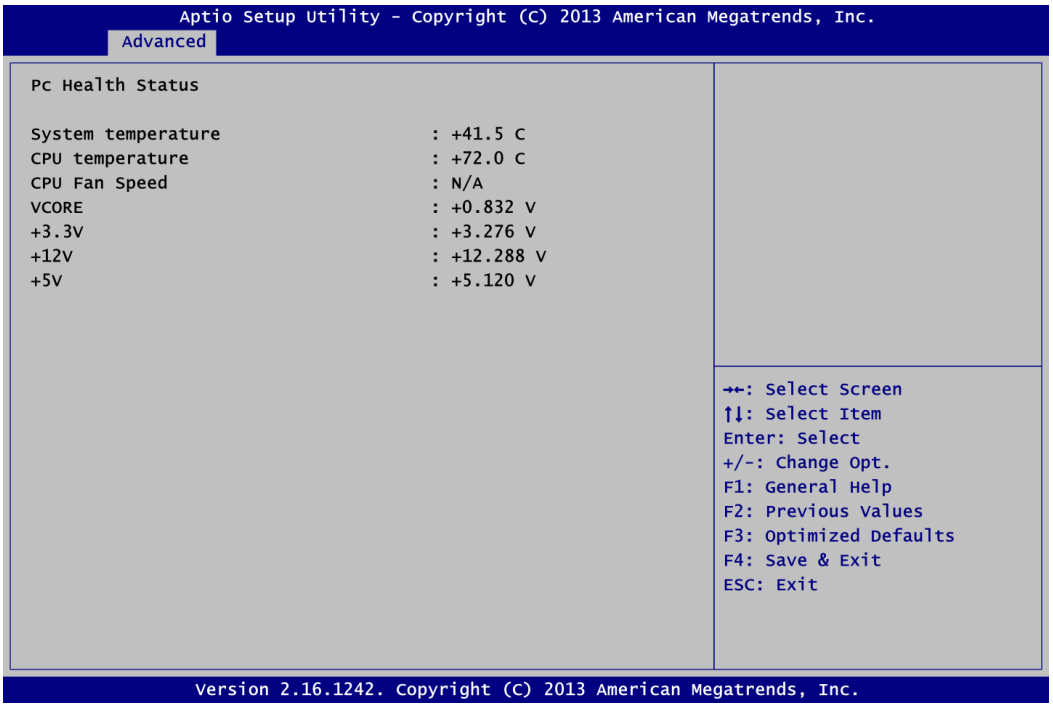
- **Serial Port 2 (COM2) Configuration**



Serial Port
Enable or disable serial port 2. The optimal setting for base I/O address is 2F8h and for interrupt request address is IRQ3.

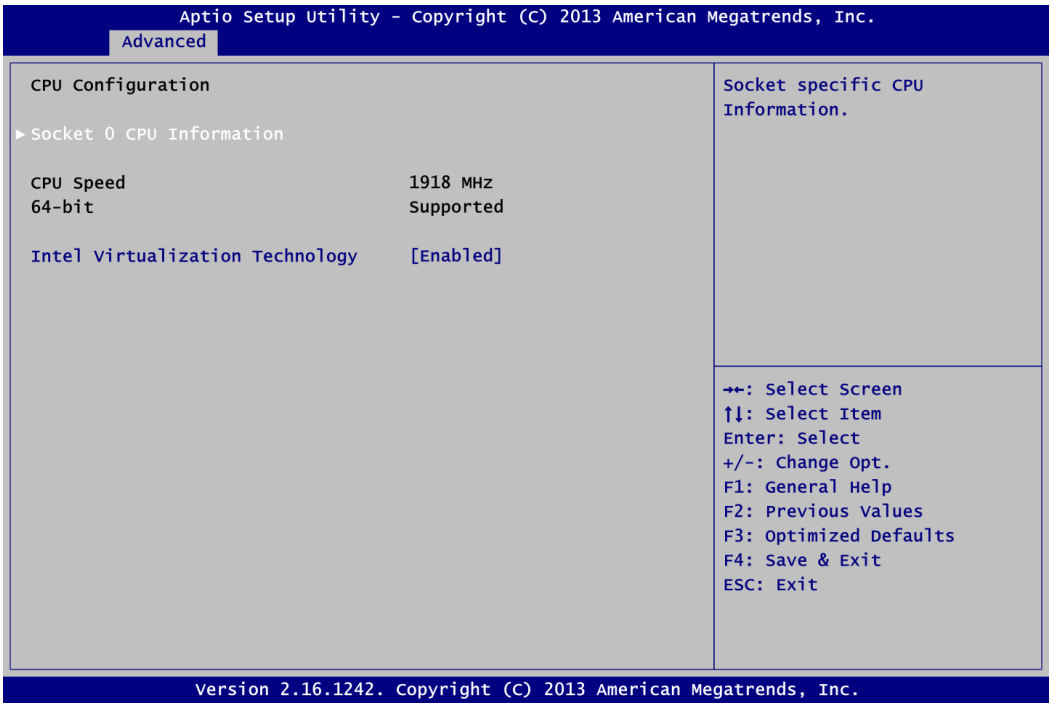
COM Port Type
Use this option to set RS-232/RS-422/RS-485 mode.

- **NCT6106D HW Monitor**
  This screen monitors hardware health status.



This screen displays the temperature of system and CPU, system voltages (VCORE, +3.3V, +12V and +5V).

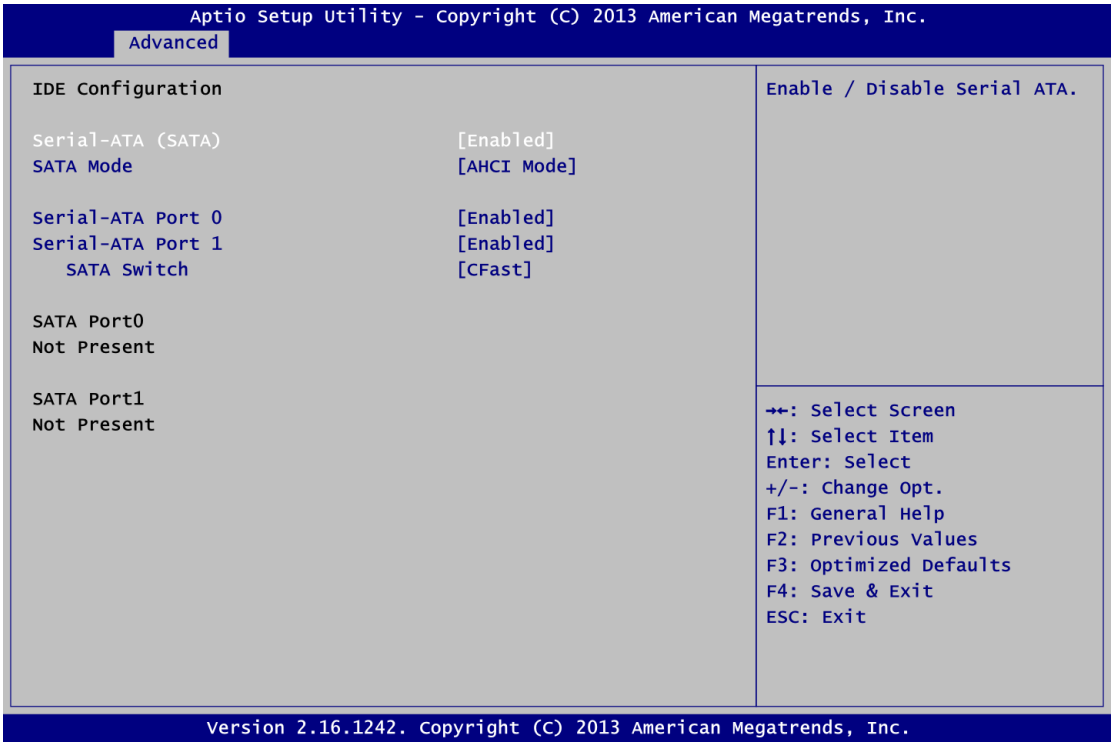
- **CPU Configuration**
  This screen shows the CPU Configuration.



Socket 0 CPU Information
This item is for socket specific CPU information.

Intel Virtualization Technology
Allow a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

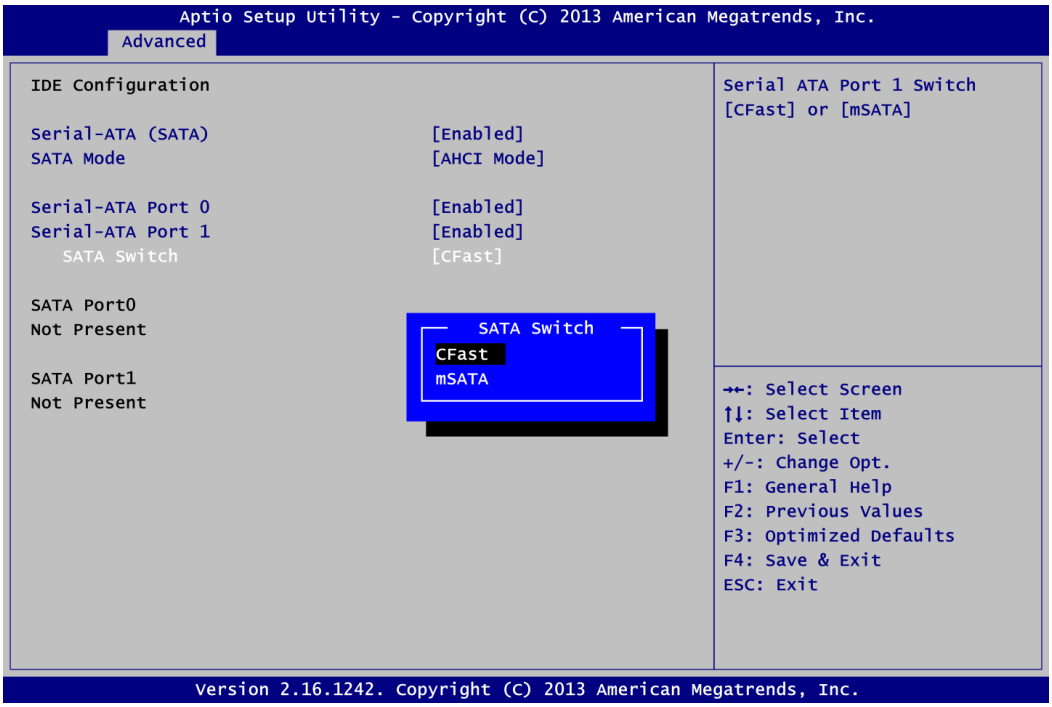
- **IDE Configuration**
  In the IDE Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.



Serial-ATA (SATA)
Enable or disable the SATA Controller feature. The default is Enabled.

SATA Mode Selection
Determine how SATA controller(s) operate. Operation mode options are IDE Mode and AHCI (Advanced Host Controller Interface) Mode. The default is AHCI Mode.

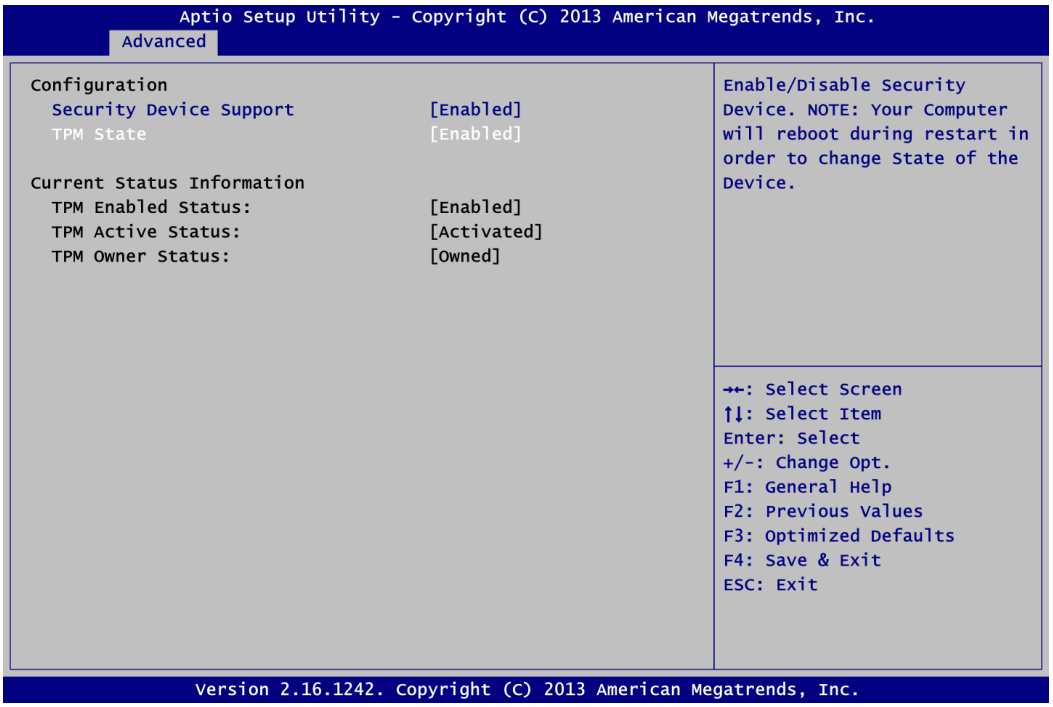
Serial-ATA Port 0
Enable or disable the onboard SATA port 0.



Serial-ATA Port 1
Enable or disable the onboard SATA port 1.

SATA Switch
This option appears only after SATA Port 1 is enabled. The default is CFast. If you intend to insert mSATA card to SCN2 (see section 2.4.22), please change setting to mSATA.

- **Trusted Computing**
  This screen provides function for specifying the TPM settings.

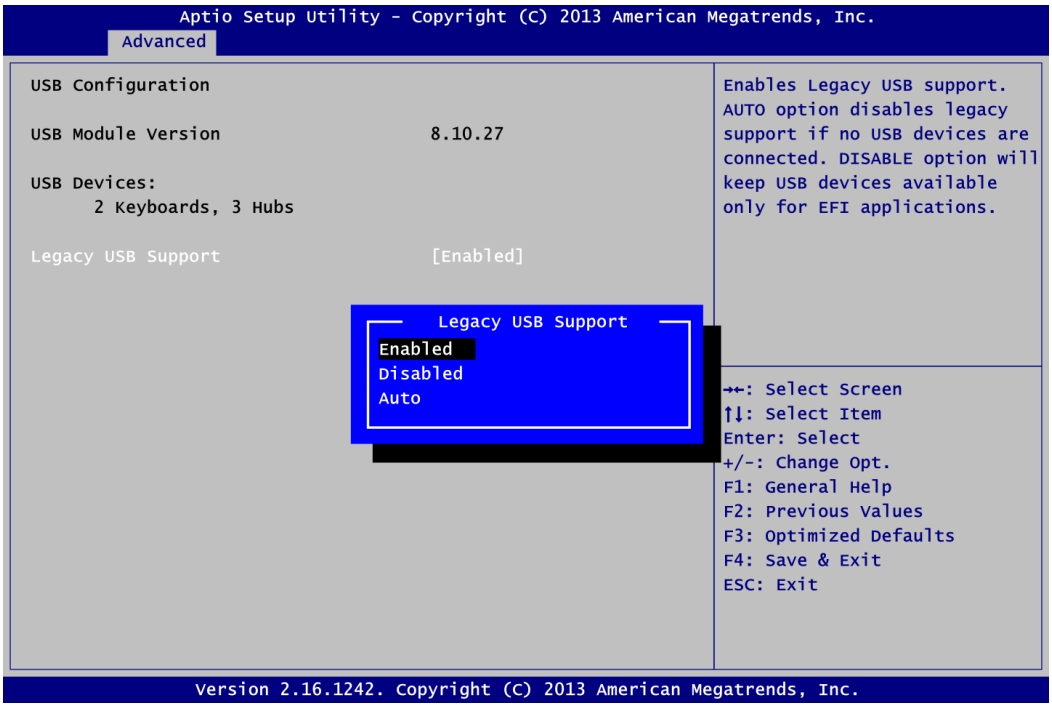


Security Device Support
Enable or disable BIOS support for security device. The default setting is Disabled.

TPM State
Once the Security Device Support is Enabled, TPM can be used by the operating system.

Current Status Information
Display current TPM status information.

- **USB Configuration**



USB Devices
Display all detected USB devices.

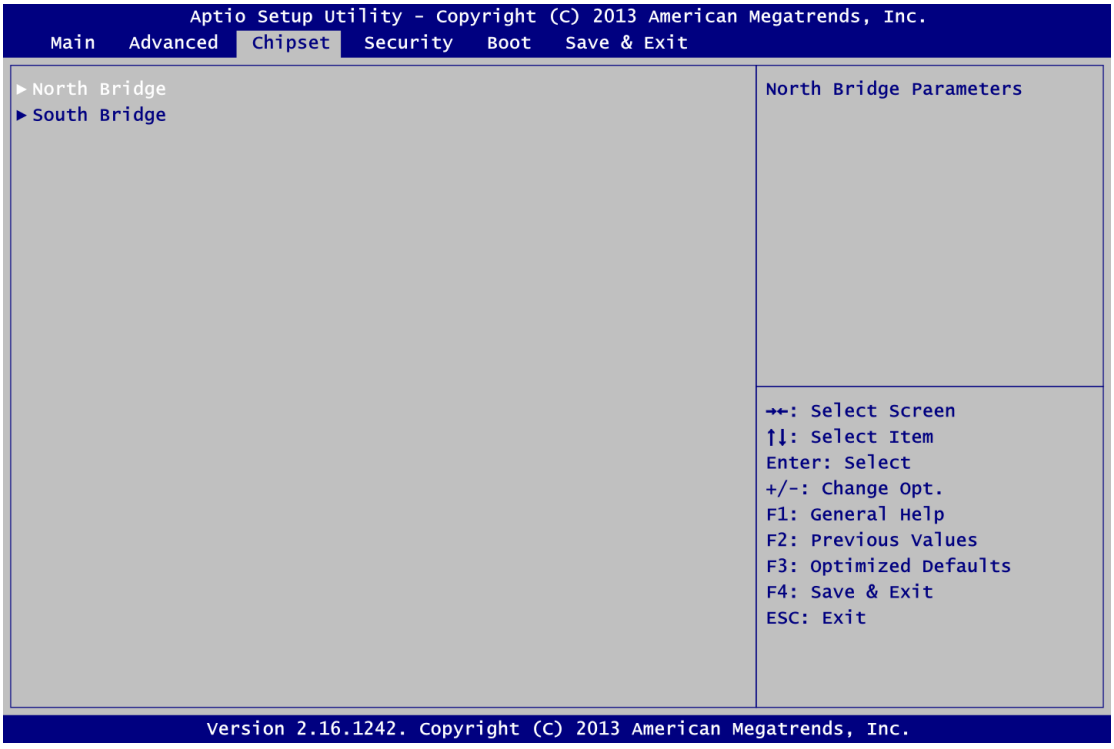
Legacy USB Support
Use this item to enable or disable support for USB device on legacy operating system. The default setting is Enabled. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications.

4.5 Chipset Menu

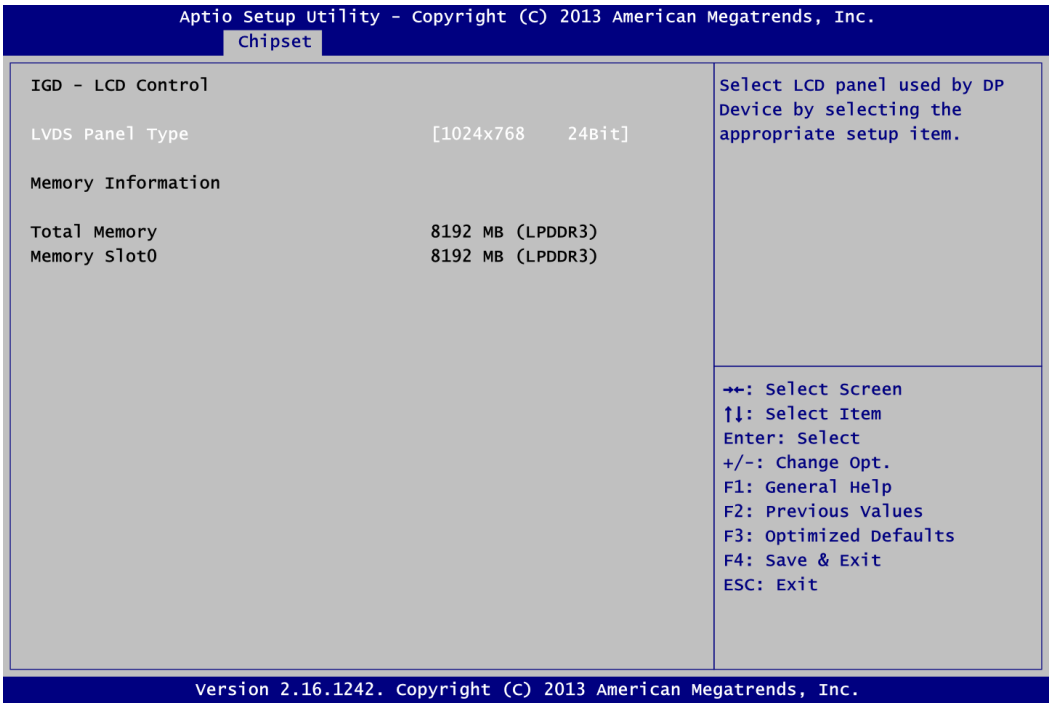
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► North Bridge
- ► South Bridge

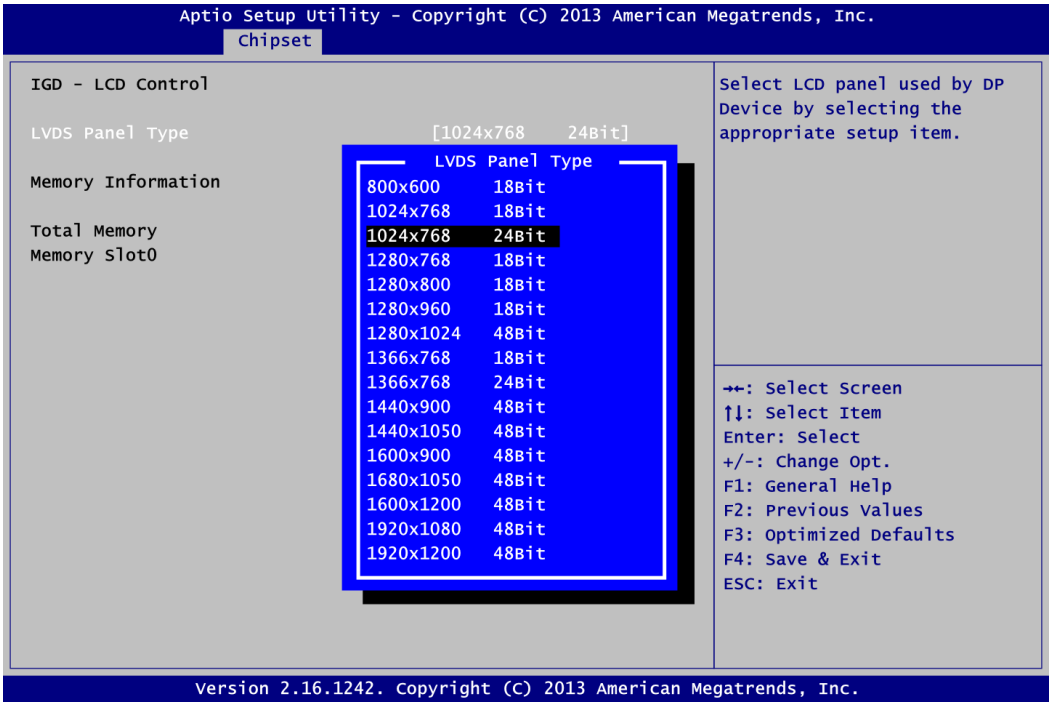
For items marked with "►", please press <Enter> for more options.



- **North Bridge**

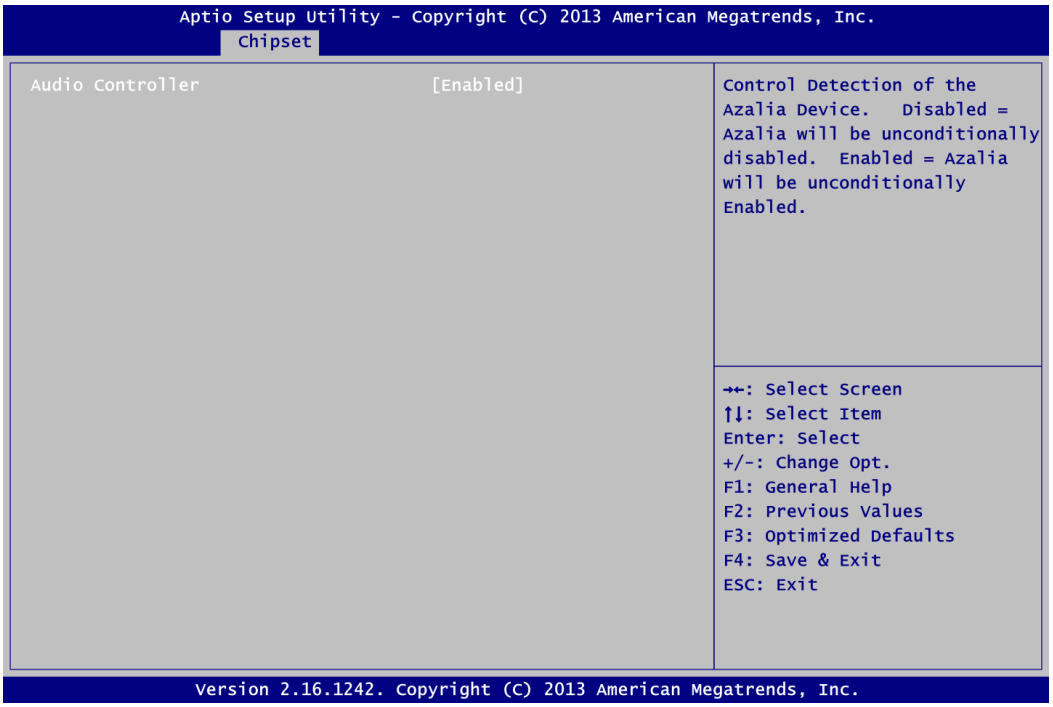


IGD - LCD Control



LVDS Panel Type
Select LVDS panel resolution.

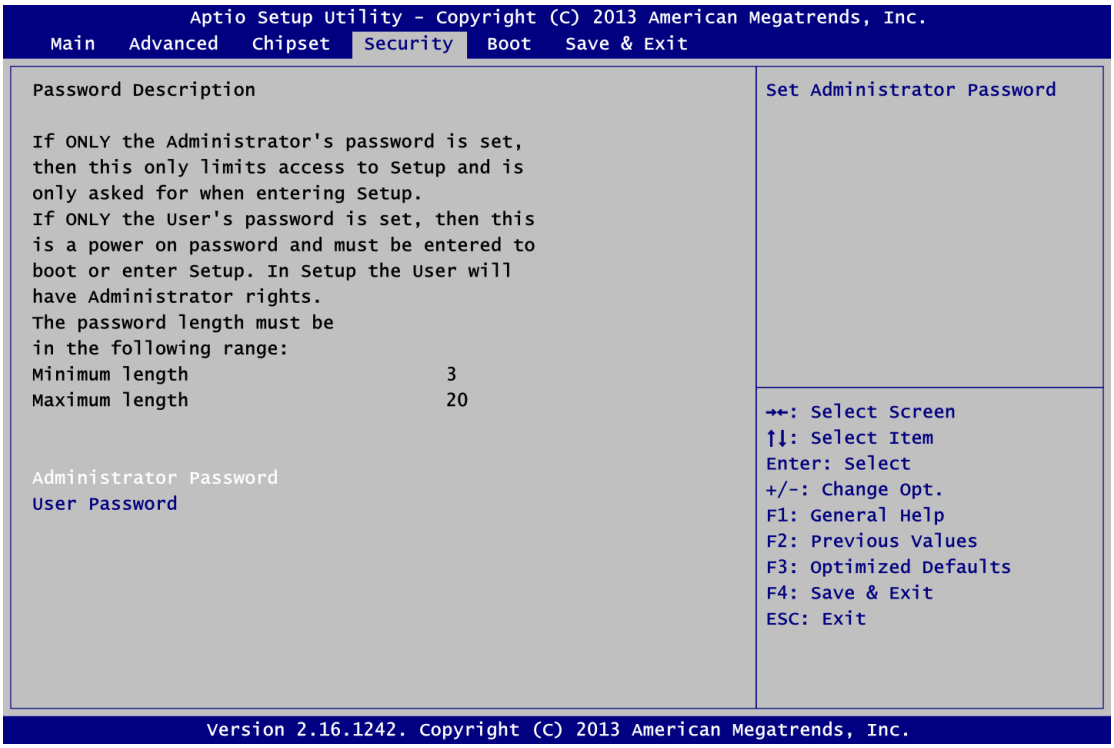
- **South Bridge**
  This screen allows users to configure parameters of South Bridge chipset.



Audio Controller
Control detection of the Azalia device.
Disabled - Azalia will be unconditionally disabled.
Enabled - Azalia will be unconditionally enabled.

4.6 Security Menu

The Security menu allows users to change the security settings for the system.

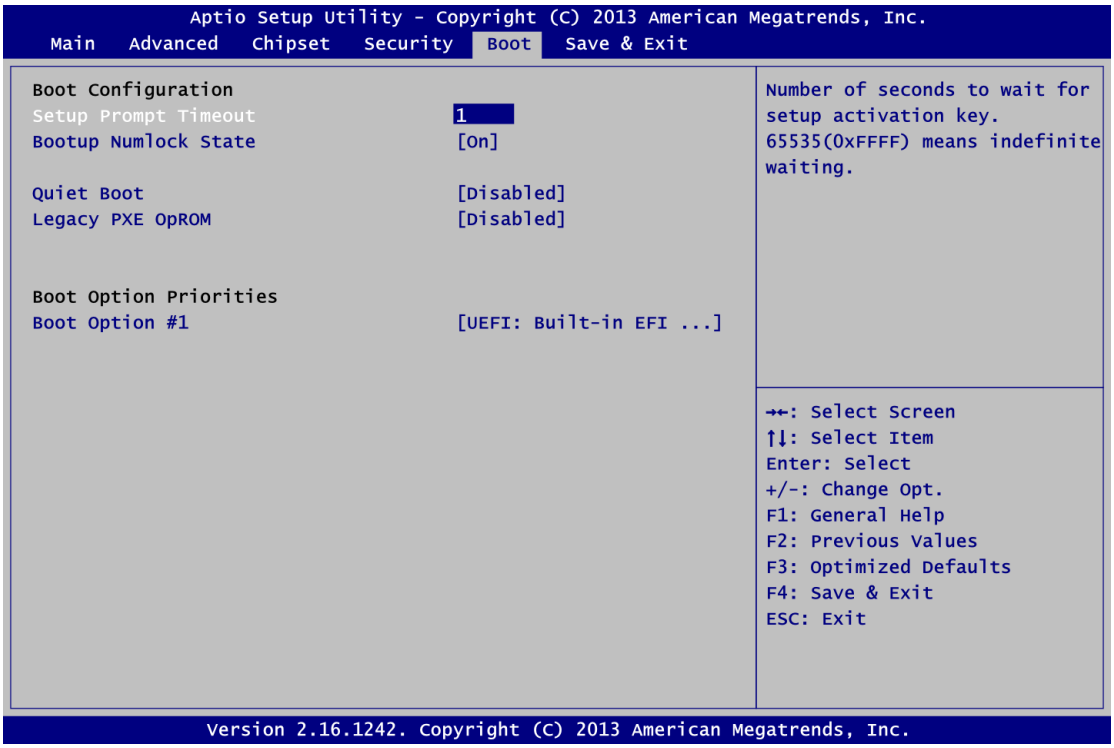


- **Administrator Password**
  This item indicates whether an administrator password has been set (installed or uninstalled).

- **User Password**
  This item indicates whether an user password has been set (installed or uninstalled).

4.7 Boot Menu

The Boot menu allows users to change boot options of the system.



- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

- **Bootup NumLock State**
  Use this item to select the power-on state for the keyboard NumLock.

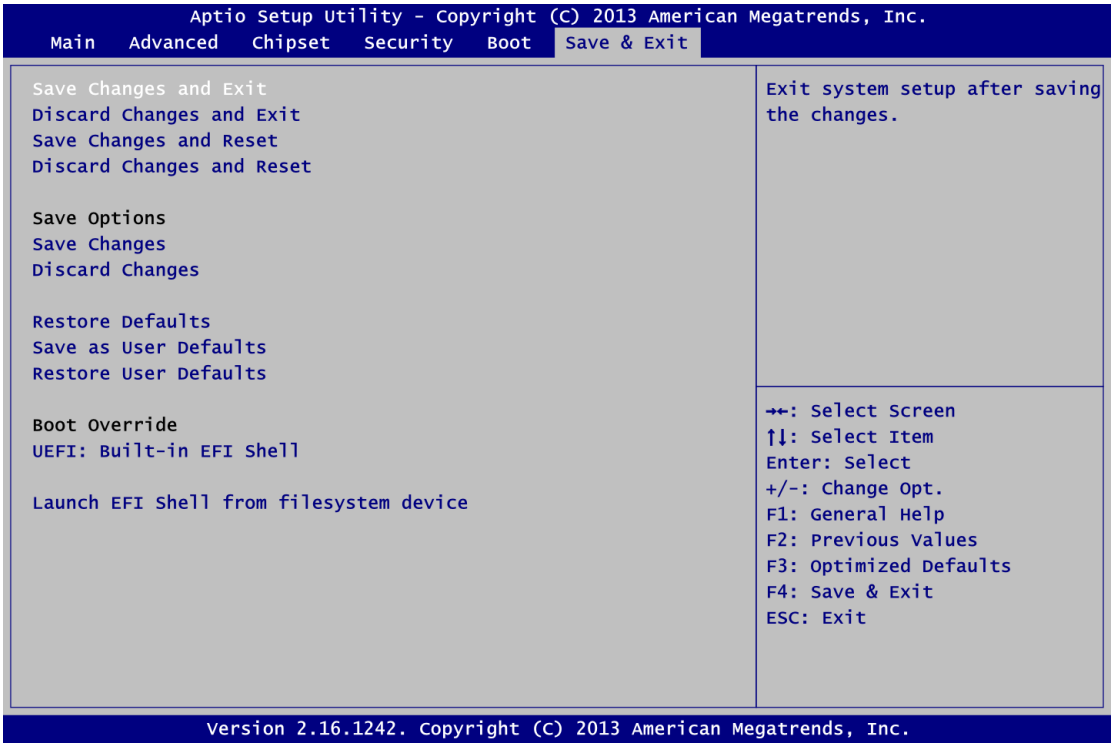
- **Quiet Boot**
  Select to display either POST output messages or a splash screen during boot-up.

- **Launch PXE OpROM**
  Use this item to enable or disable the boot ROM function of the onboard LAN chip when the system boots up.

- **Boot Option Priorities**
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

4.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

- **Save Changes and Reset**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

- **Save Changes**
  When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

- **Restore Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

- **Save as User Defaults**
  Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

- **Restore User Defaults**
  It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

- **Boot Override**
  Select a drive to immediately boot that device regardless of the current boot order.

- **Launch EFI Shell from filesystem device**
  Attempt to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

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Chapter 5
Drivers Installation

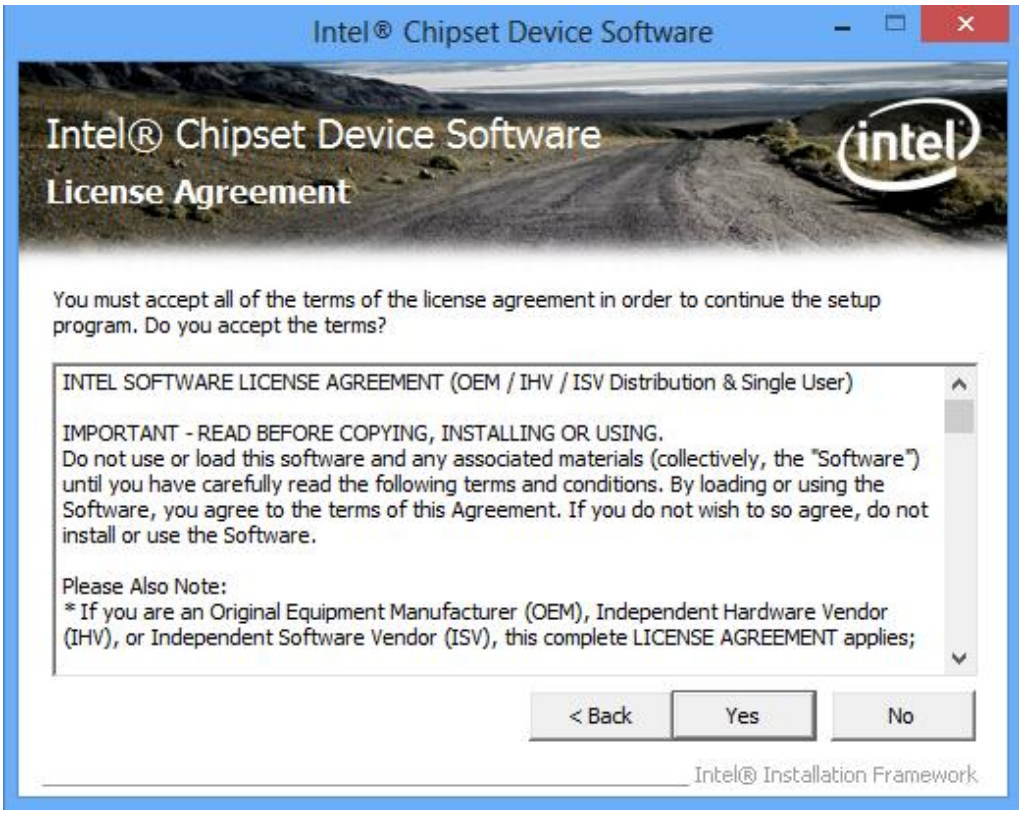
The device drivers are located on the product information CD that comes with the CAPA841/842 Series package. The auto-run function of drivers will guide you to install the utilities and device drivers under Windows® system. You can follow the onscreen instructions to install these devices:

- Chipset
- Graphics
- Ethernet
- Audio
- Trusted Execution Engine for Windows® 8
- Sideband Fabric Device for Windows® 8

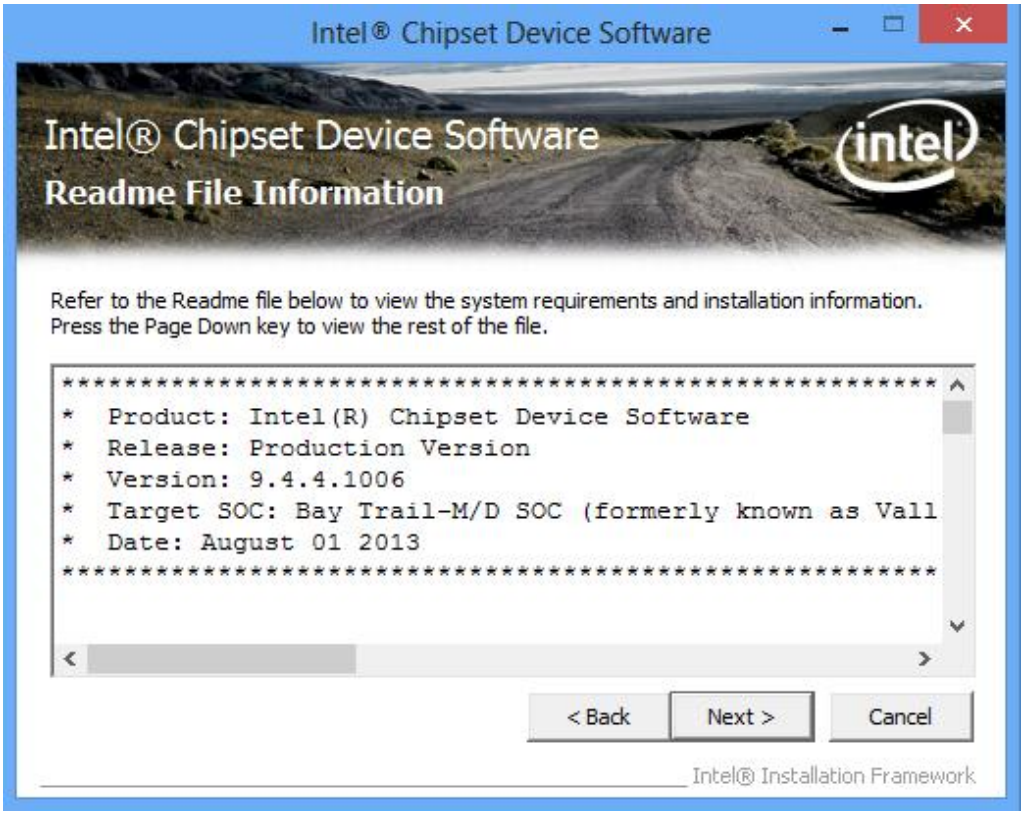
5.1 Installing Chipset Driver

1. Run setup program from driver directory in product information CD. Click “Next” to next step.

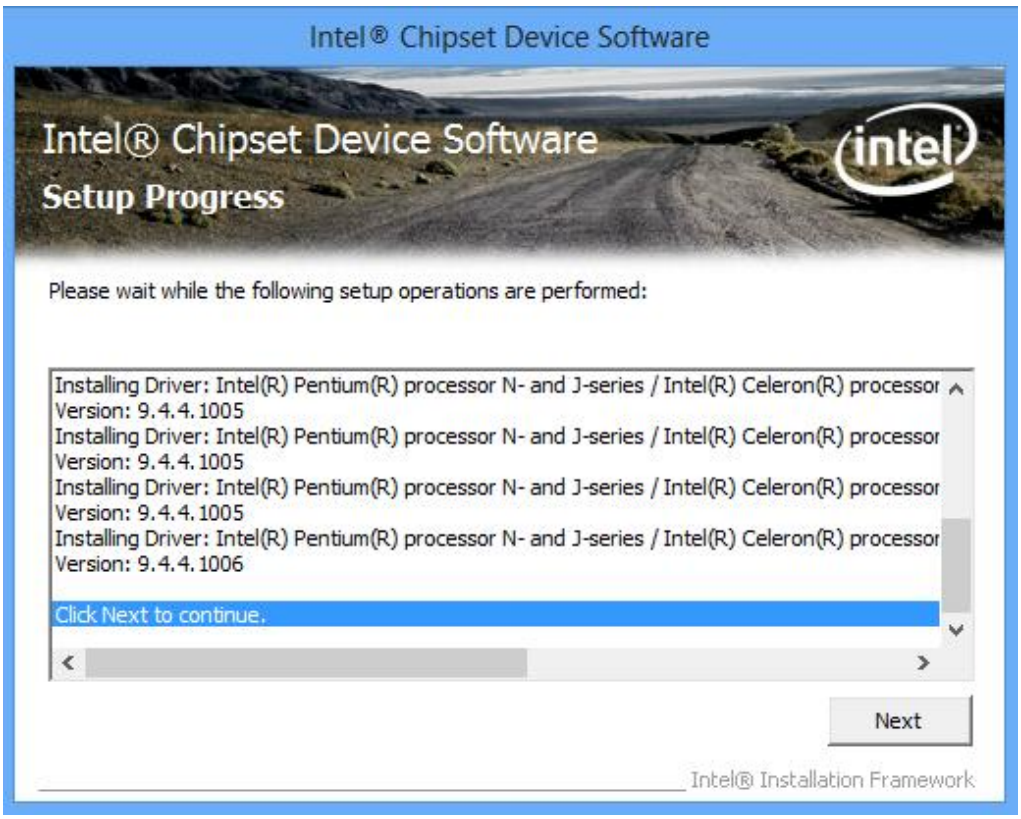
2. When the following License Agreement screen appears, please click “Yes” to next step.



3. A Readme File Information screen appears to show you the system requirements and installation information. Click “Next” to next step.



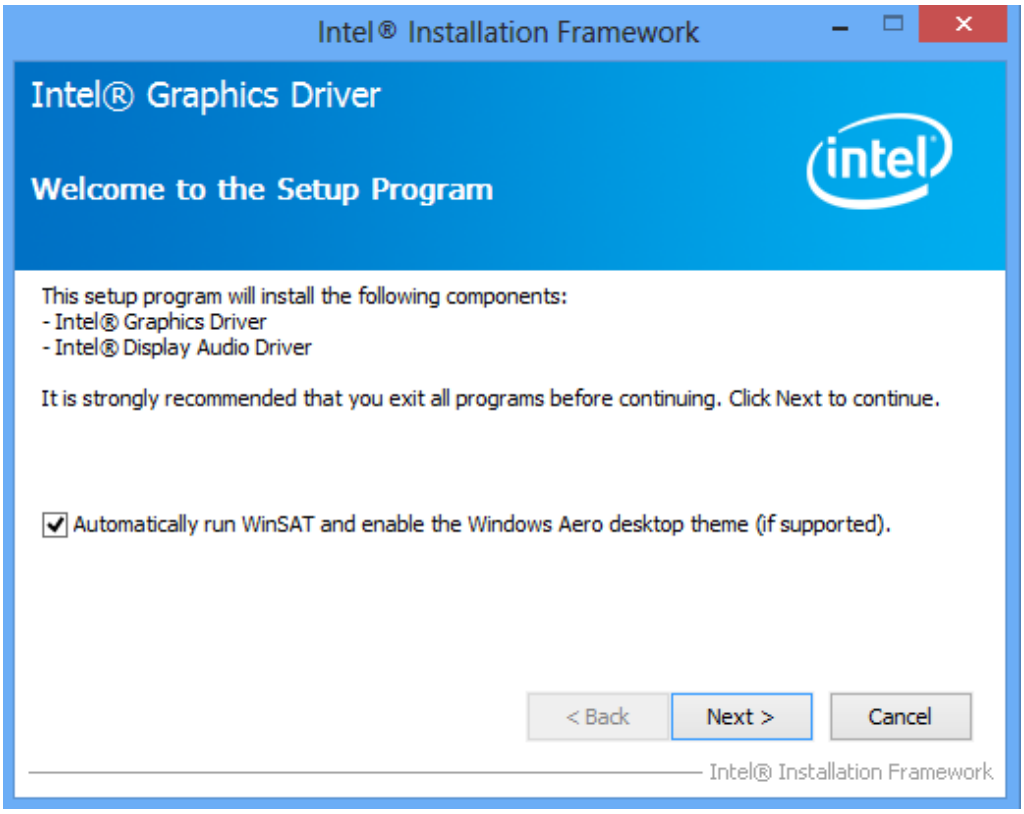
4. Please wait while setup processes the following operations.



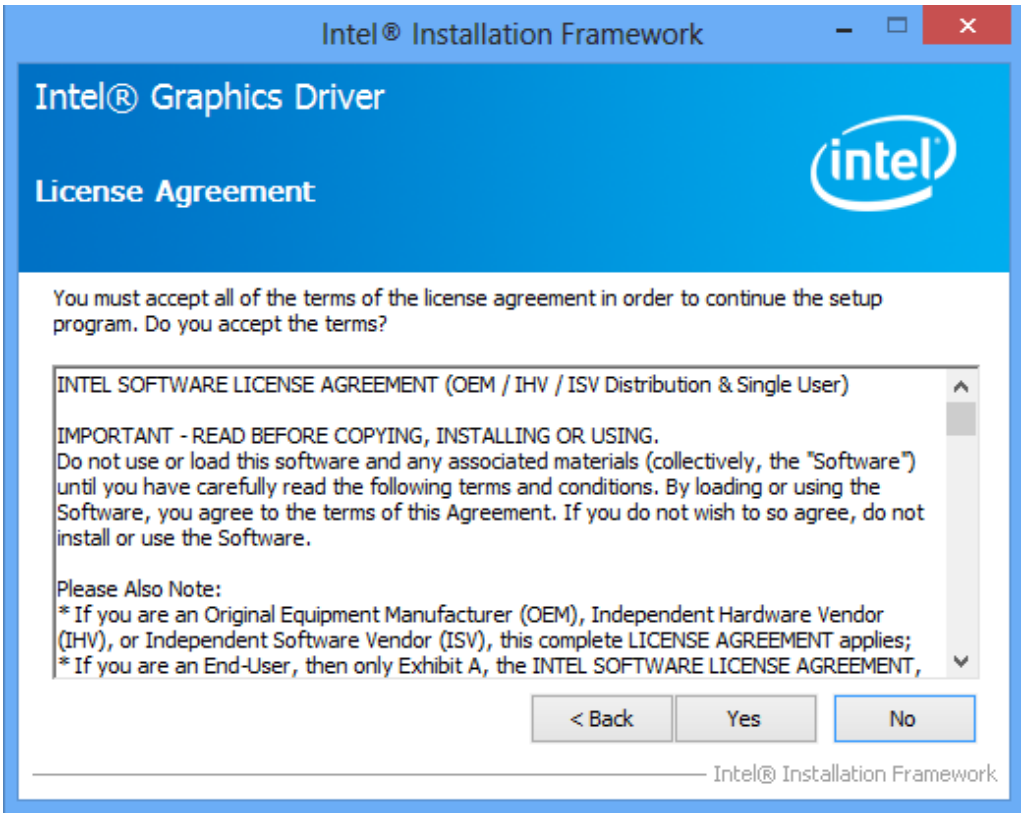
5. You are suggested to select “Yes, I want to restart this computer now”. Click “Finish” to complete the setup process and reboot.

5.2 Installing Graphics Driver

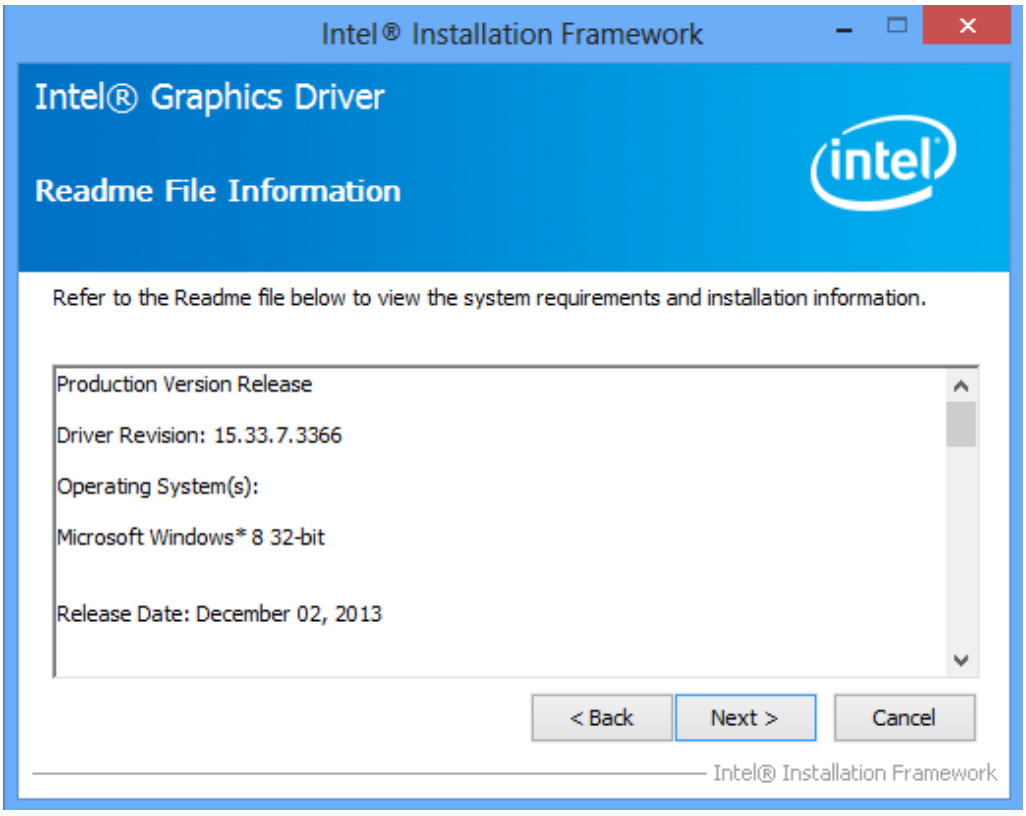
1. Run setup program from driver directory in product information CD. Click “Next” to start the installation.



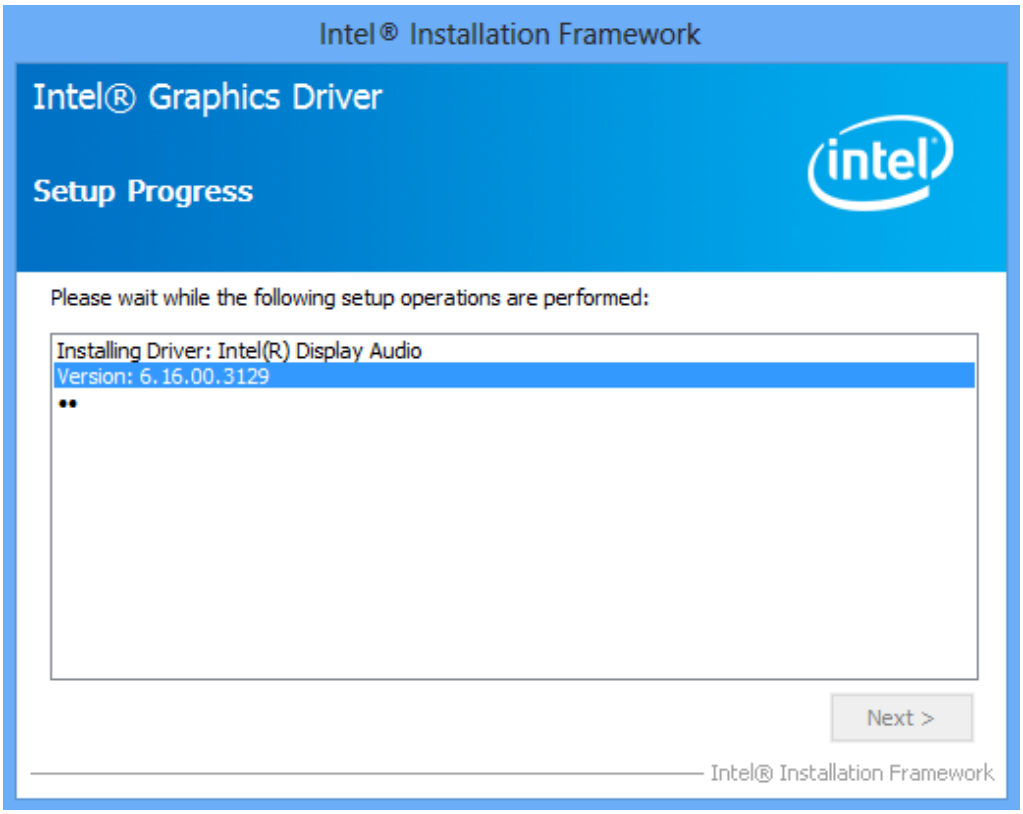
2. When Intel® License Agreement screen appears, please click “Yes” to next step.



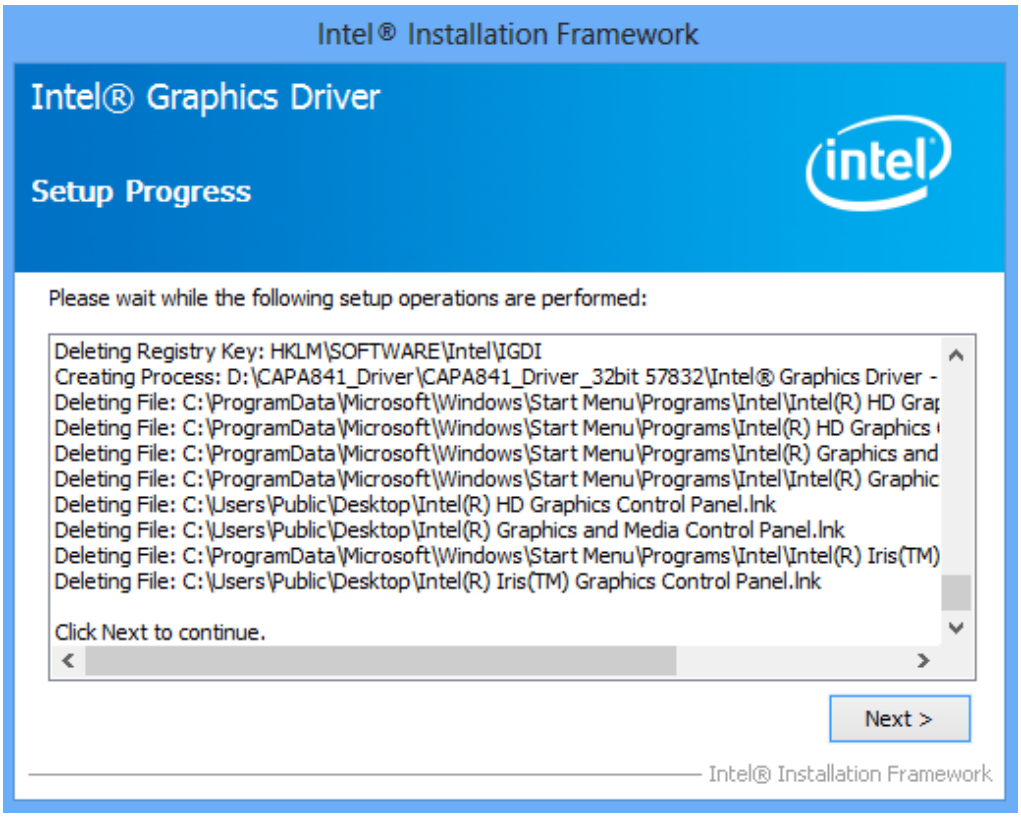
3. A Readme File Information screen appears to show you the system requirements and installation information. Click “Next” to next step.



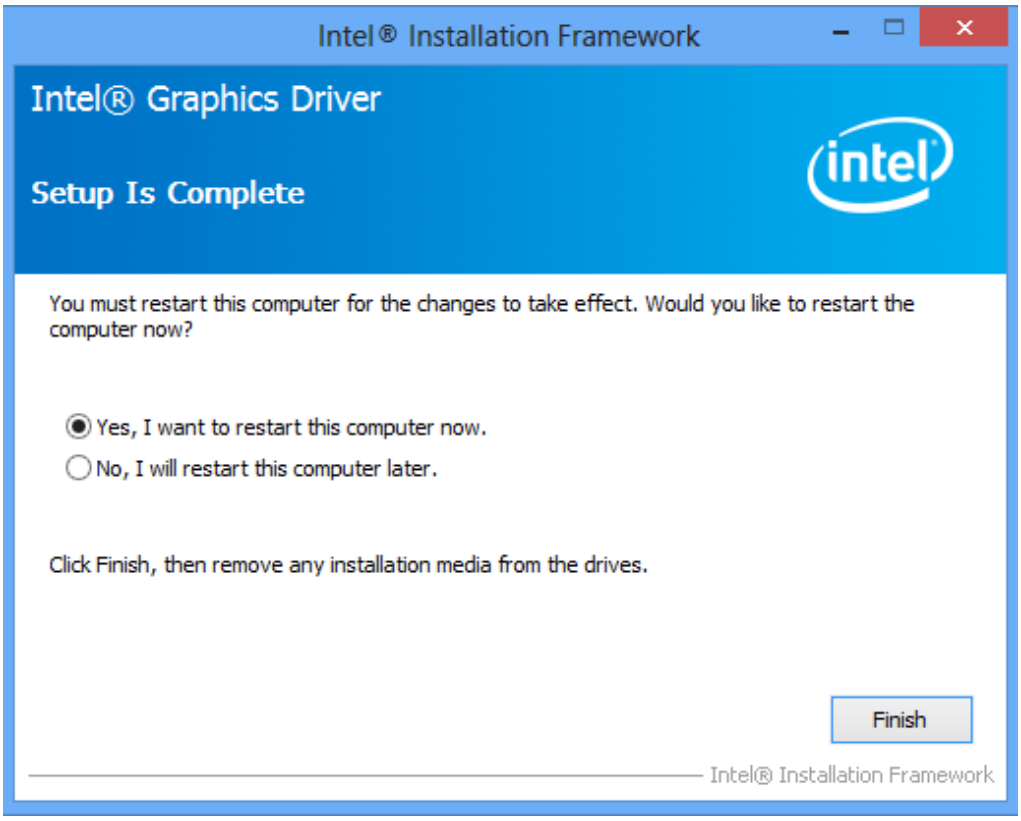
4. Please wait while setup processes the following operations.



5. When the following screen appears, please click “Next”.

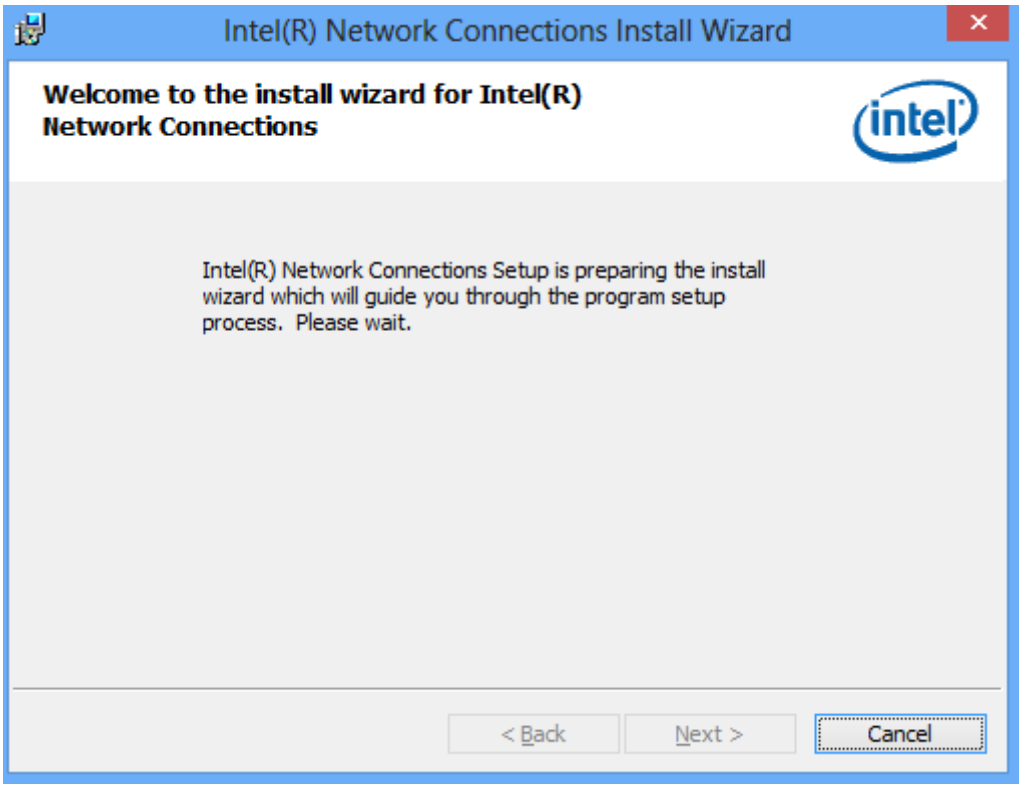


6. You are suggested to select “Yes, I want to restart this computer now”. Click “Finish” to complete the setup process and reboot.

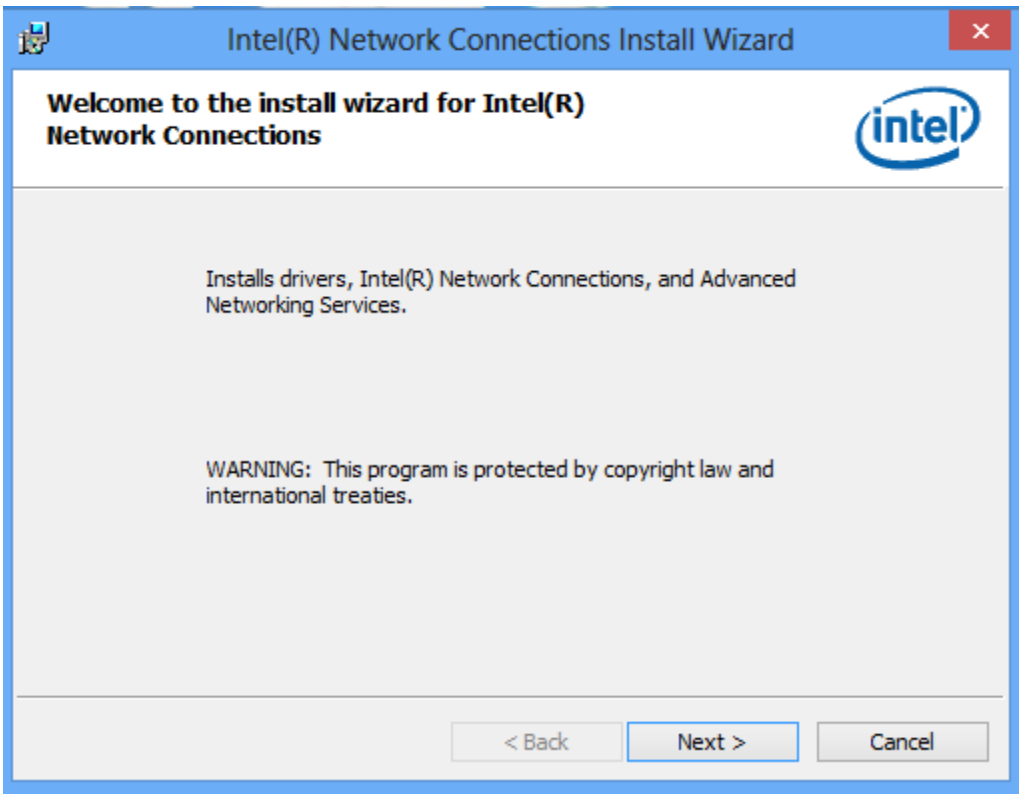


5.3 Installing Ethernet Driver

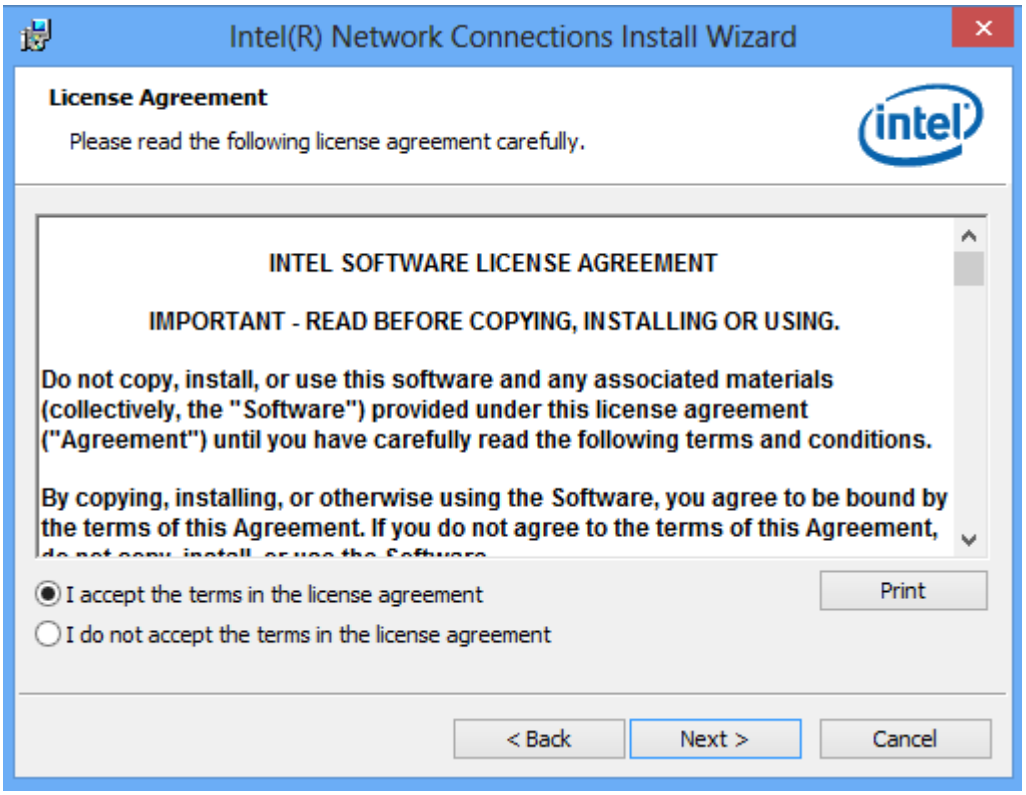
1. Run setup program from driver directory in product information CD. When the following screen appears, please wait while setup prepares the install wizard.



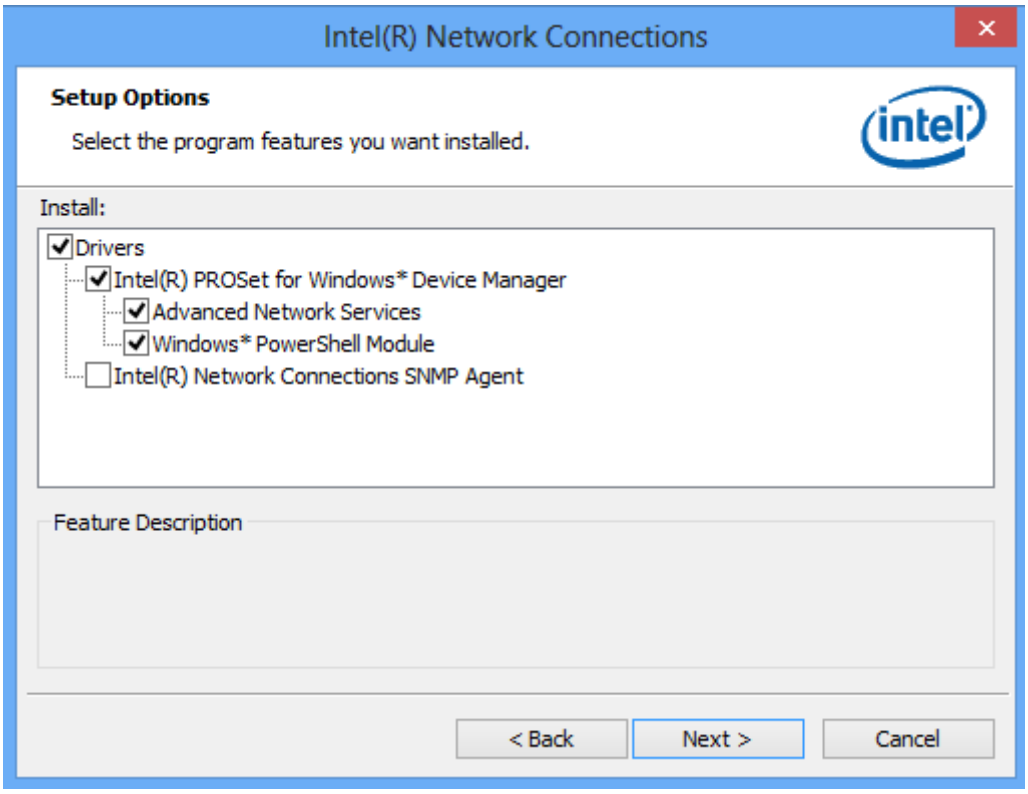
2. Click “Next” to continue.



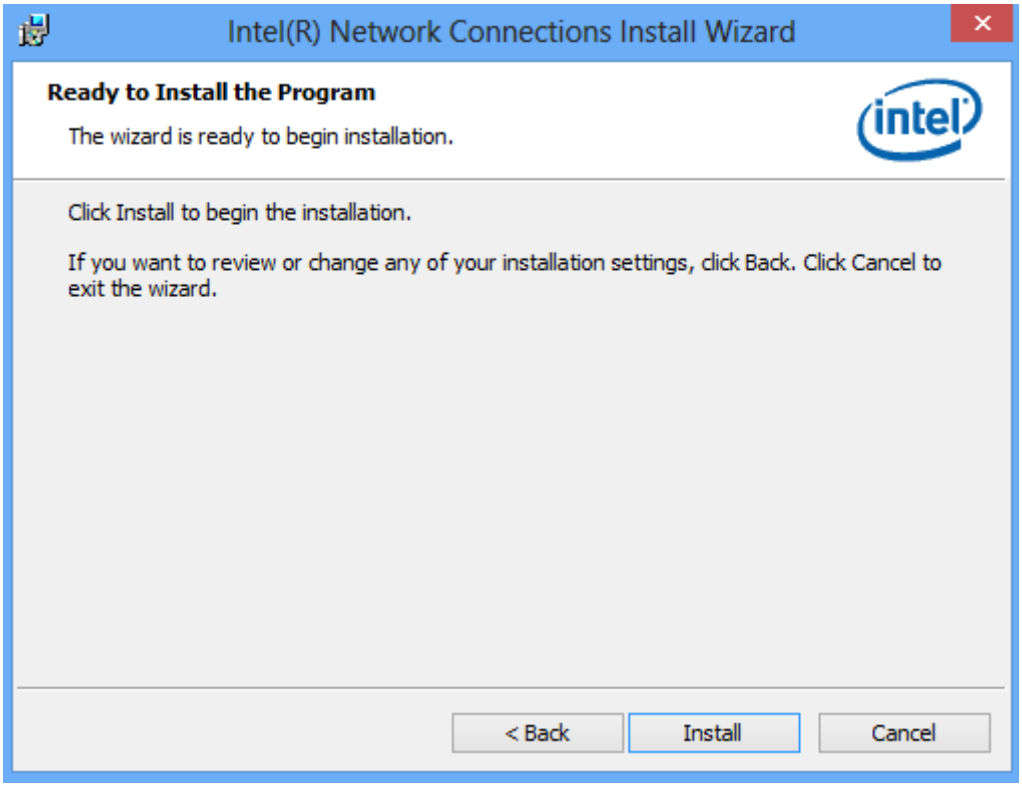
3. When Intel® License Agreement screen appears, read it carefully. You are suggested to select “I accept the terms in the license agreement”. Click “Next” to continue.



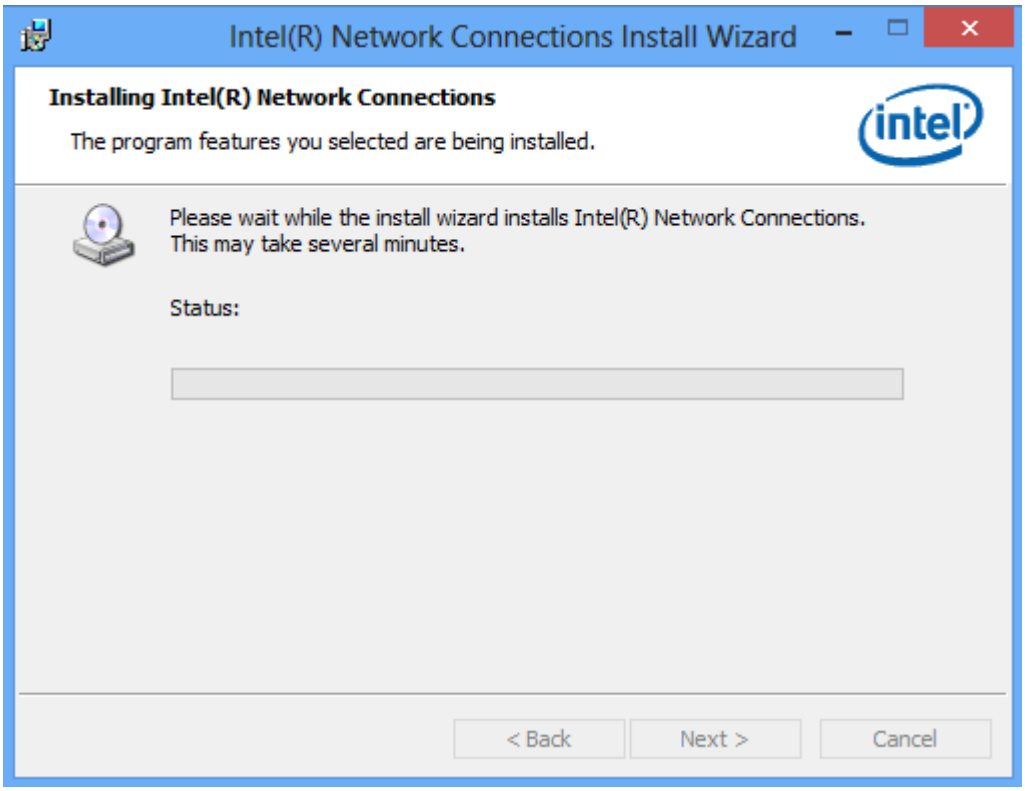
4. When the following screen appears, please select the program features you want to install. Click “Next” to continue.



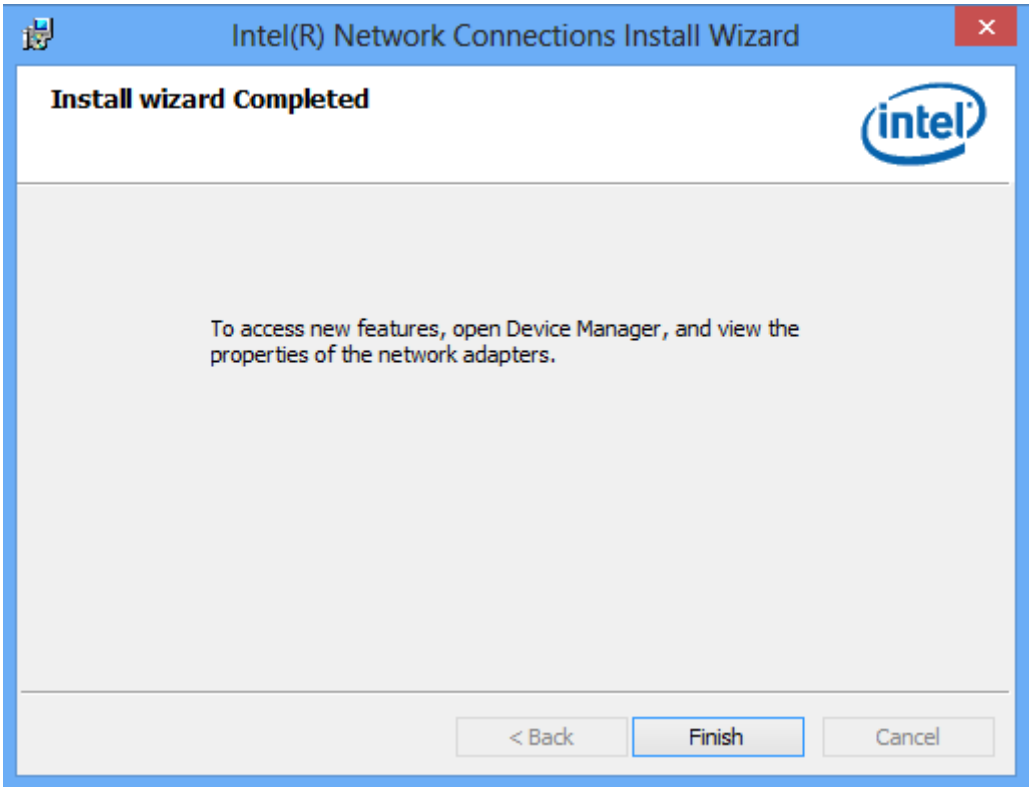
5. Now install wizard is ready. Click “Install” to begin installation.



6. Please wait while setup processes the following operations.

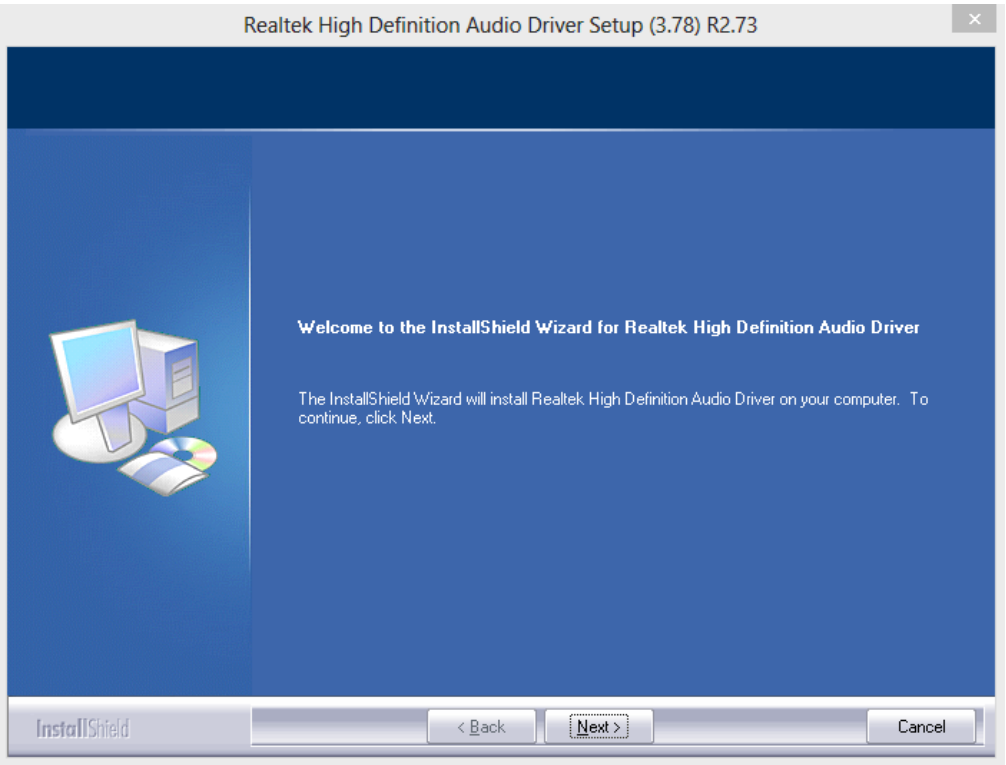


7. When driver installation is complete, the following screen appears. Click “Finish” to exit.

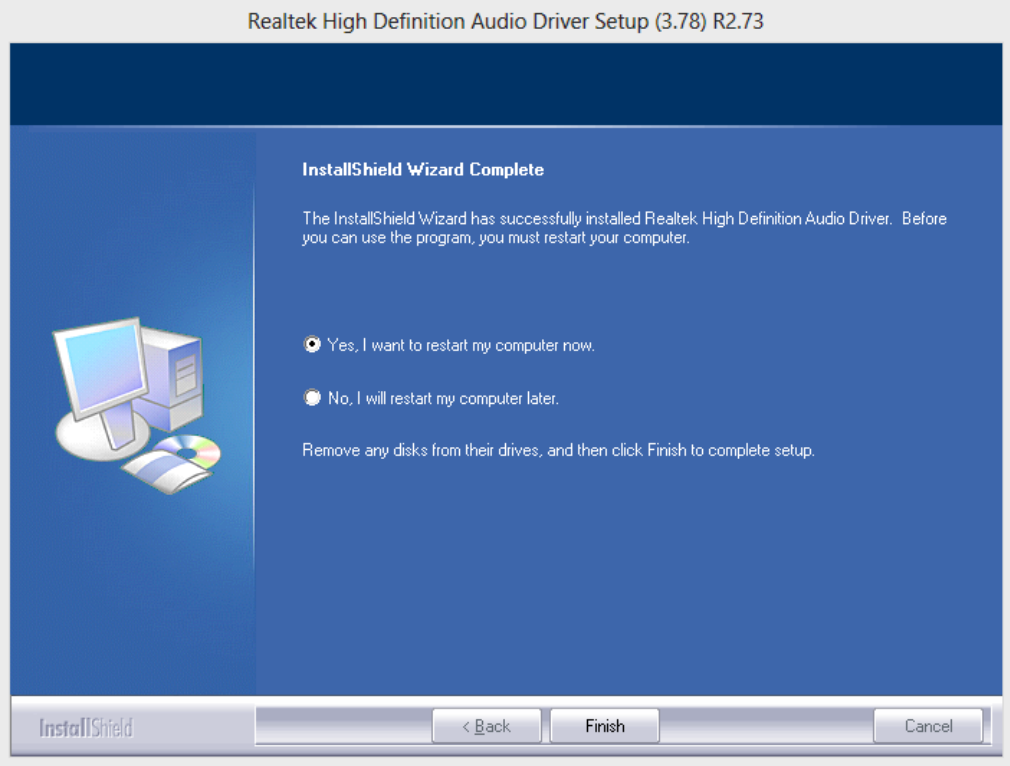


5.4 Installing Audio Driver

1. Run setup program from driver directory in product information CD. Click “Next” to continue.

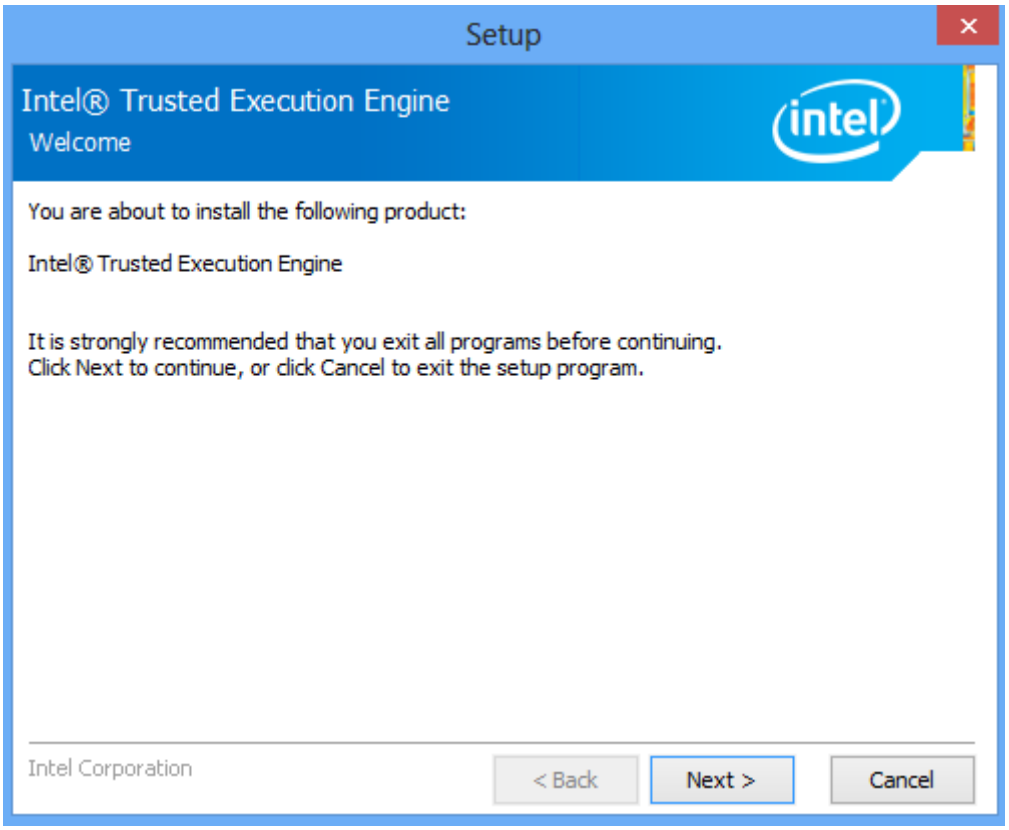


2. You are suggested to select “Yes, I want to restart my computer now”. Click “Finish” to complete setup and reboot.



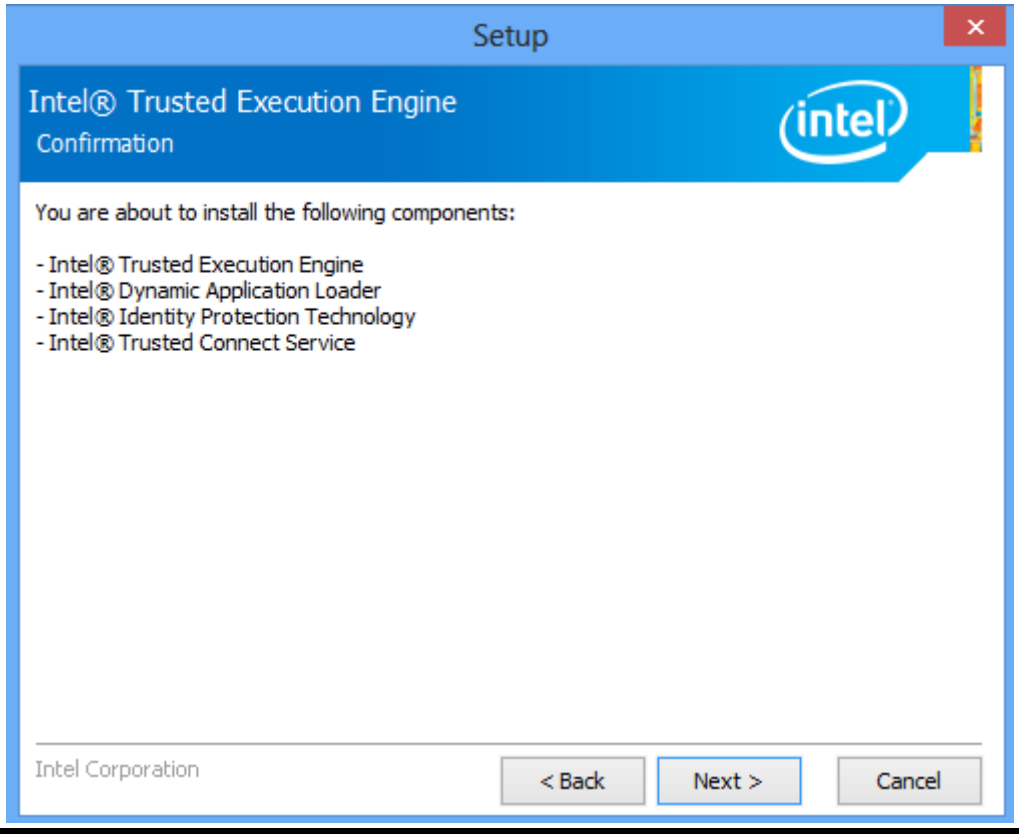
5.5 Installing Trusted Execution Engine

1. Run setup program from driver directory in product information CD. When the following screen appears, click “Next” to continue.

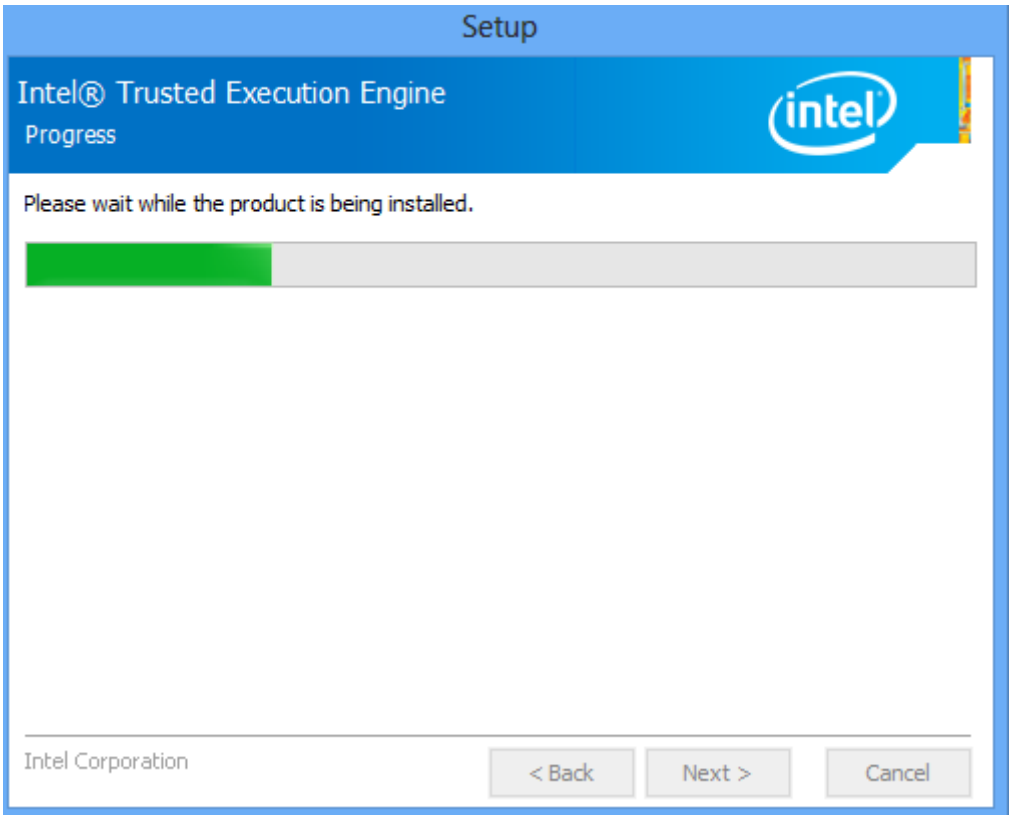


2. When Intel® License Agreement screen appears, read it carefully. You are suggested to select “I accept the terms in the License Agreement”. Click “Next” to continue.

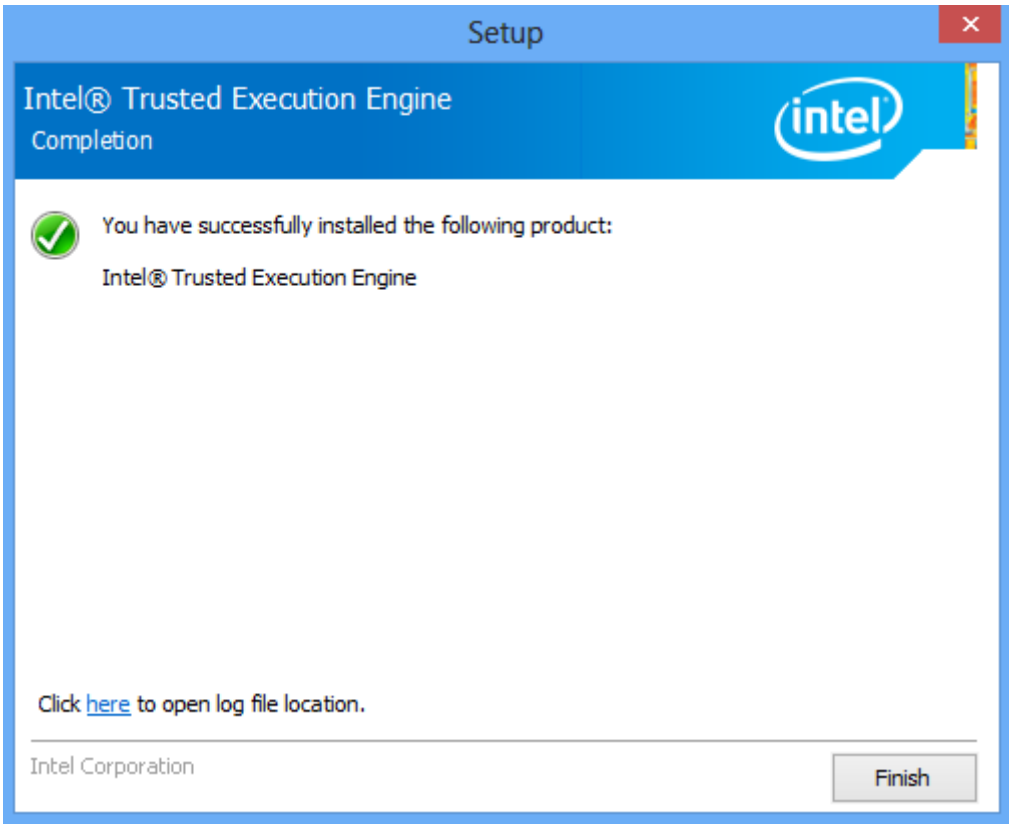
3. Now install wizard is ready. Click “Next” to begin installation.



4. Please wait while setup processes the following operations.

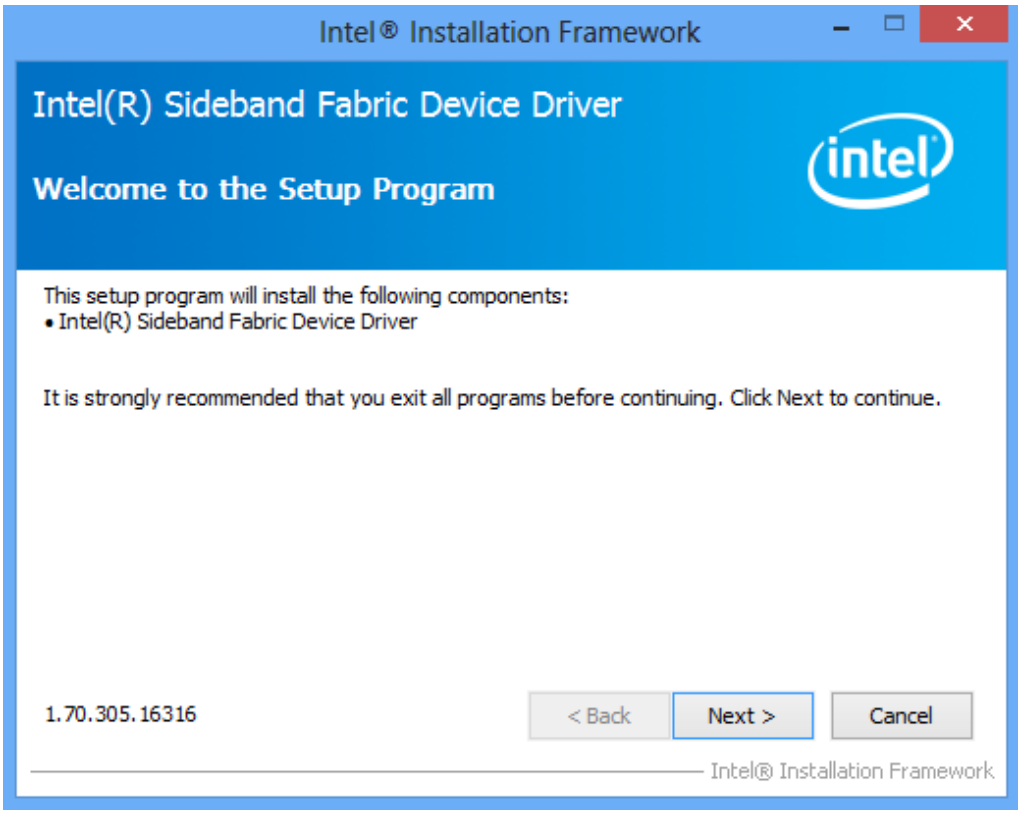


5. When installation is complete, the following screen appears. Click “Finish” to exit.

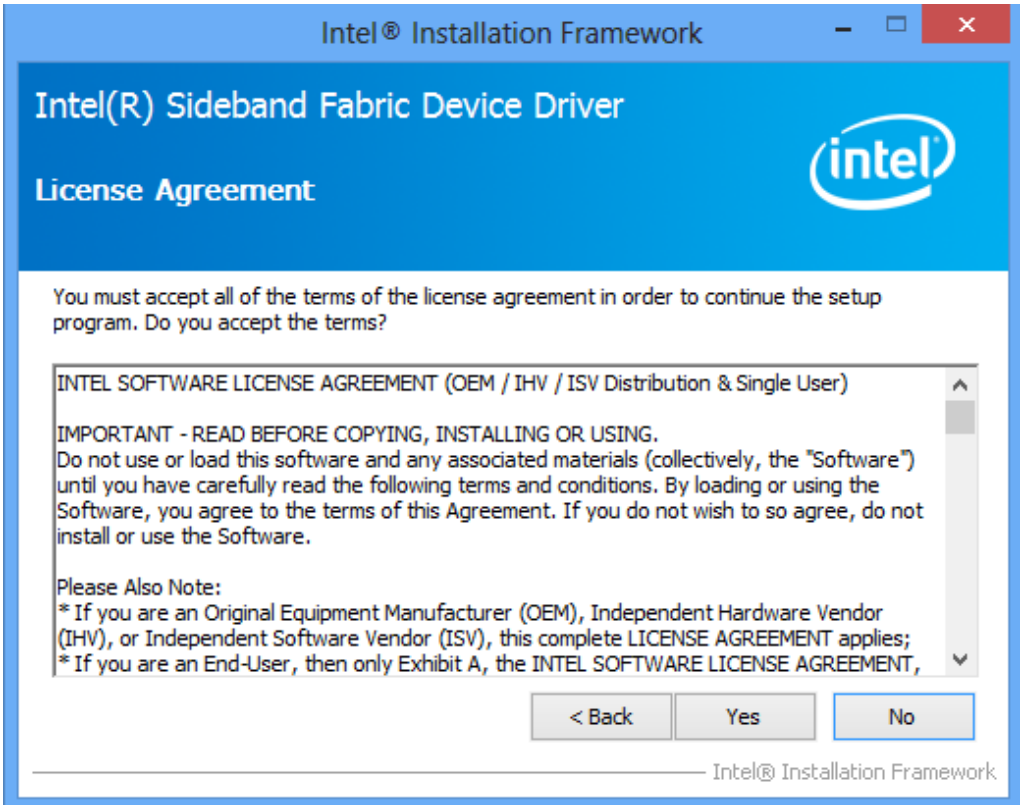


5.6 Installing Sideband Fabric Device

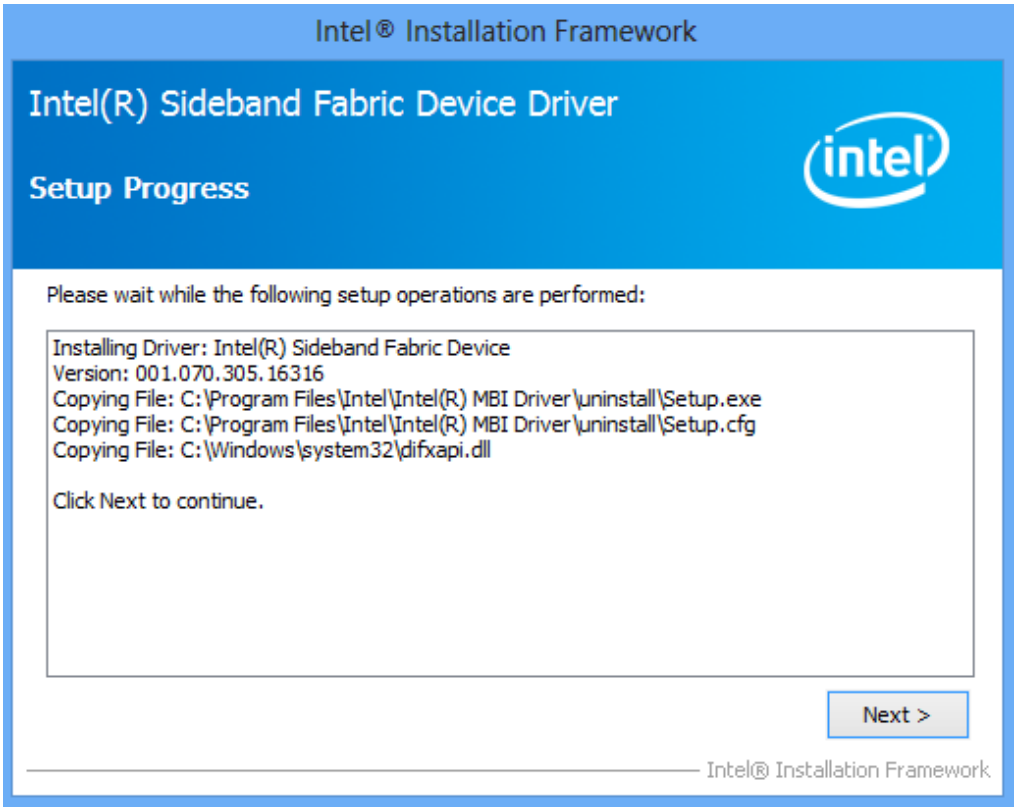
1. Run setup program from driver directory in product information CD. When the following screen appears, click “Next” to continue.



2. When Intel® License Agreement screen appears, read it carefully. You are suggested to select “I accept the terms in the License Agreement”. Click “Yes” to continue.



3. Please wait while setup processes the following operations.



4. When installation is complete, you are suggested to select “Yes, I want to restart my computer now”. Click “Finish” to complete setup and reboot.

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Appendix A
Watchdog Timer

About Watchdog Timer

After the system stops working for a while, it can be auto-reset by the watchdog timer. The integrated watchdog timer can be set up in the system reset mode by program.

How to Use Watchdog Timer

The following example enables configuration using debug tool.

Enable WDT
↓
Enable configuration:
O 2E 87 ; Un-lock super I/O
O 2E 87
↓
Select logic device:
O 2E 07
O 2F 08
↓
WDT device enable:
O 2E 30
O 2F 01
↓
Set timer unit:
O 2E F0
O 2F 00 ; (00: Sec; 08:Minute)
↓
Set base timer:
O 2E F1
O 2F 0A ; Set reset time (where 0A (hex) = 10sec)

Disable WDT
↓
Enable configuration:
O 2E 87 ; Un-lock super I/O
O 2E 87
↓
Select logic device:
O 2E 07
O 2F 08
↓
WDT device disable:
O 2E 30
O 2F 00

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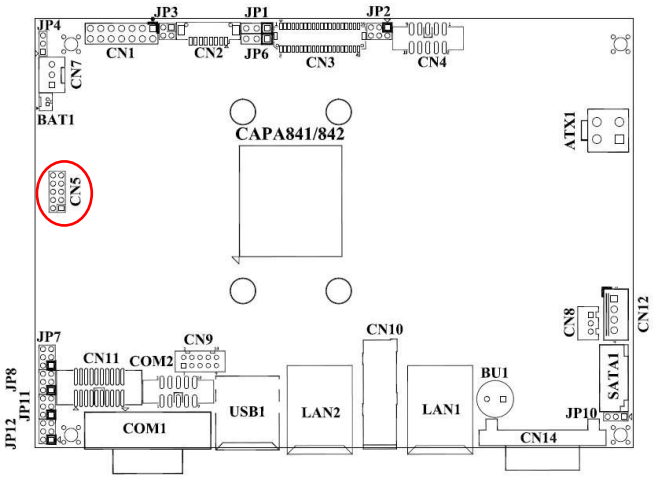
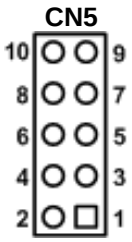
Appendix B
Digital I/O

About Digital I/O

The onboard digital I/O has 8 bits (DIO0~7). Each bit can be set to function as input or output by software programming. In default, all pins are pulled high with +5V level (according to main power). The BIOS default settings are 3 inputs and 5 outputs where all of these pins are set to 1.





Pin	Signal	Pin	Signal
1	DI0 (Bit0)	2	DO0 (Bit 3)
3	DI1 (Bit1)	4	DO1 (Bit 4)
5	DI2 (Bit2)	6	DO2 (Bit 5)
7	GND	8	DO3 (Bit 6)
9	GND	10	DO4 (Bit 7)

Digital I/O Programming

The following example enables configuration using debug tool.

```
Start digital I/O programming
↓
Enable configuration:
                              O 2E 87    ; Un-lock super I/O
                              O 2E 87
↓
Select logic device:
                              O 2E 07
                              O 2F 07
↓
Set multi-function selection:
                              O 2E 1C
                              O 2F 1C    ; Open GPIO2 and close UART
↓
Set GPIO2 I/O register:
                              O 2E E8
                              O 2F 00    ; 00: Programmed to function as output port
                                         ; FF: Programmed to function as input port
↓
Set GPIO2 data register:
; Set digital output pins value
                              O 2E E9
                              O 2F 00    ; 00: Set digital output to low level
                                         ; FF: Set digital output to high level
↓
Digital Input:
; Read digital input data
                              O 2E E9
                              i 2F       ; FF: Digital input data is high (default state)
```